Self-regulation and language skills of 4- to 5-year-old children with English as an additional language before and after a guided play intervention as measured by teacher reports and cognitive batteries

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Tanya M Paes
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Abstract

Self-regulation and language skills of 4- to 5-year-old children with English as an additional language before and after a guided play intervention as measured by teacher reports and cognitive batteries

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There has been increasing interest in pretend play and children's cognitive development. This study examines the efficacy of a guided pretend play intervention on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds. The sample consisted of 151 children who were randomized into two groups: (a) Guided pretend play; and (b) Art activities. A third typical curriculum group was also included in the study. The intervention included sixteen 30-minute sessions in groups of five children. Each session included: (1) storybook reading; (2) role-playing; and (3) review. During storybook reading explicit phonological awareness and vocabulary instruction were provided for target words. Role-playing involved giving children props to partake in guided pretend play. Review involved revising the phonological awareness and vocabulary of the target words. The findings show that children in the guided pretend play group had significantly greater improvement in their phonological awareness skills post-intervention compared to children who were exposed to typical curriculum.

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List of Abbreviations

CELF-P2	The Clinical Evaluation of Language Fundamentals-Preschool-2
EAL	English as an additional language
HK	Hong Kong
NEPSY-II	Neuropsychological Assessment Second Edition
SES	Socioeconomic Status
UK	United Kingdom
USA	United States of America

Chapter One

Introduction

Lillard et al. (2013) states that there is a particular gap in the literature that examines the effect of pretend play on children's self-regulation skills. Bodrova and Leong (2007) elaborate that in the field of education, there is a lack of understanding amongst practitioners regarding how self-regulation influences the child's ability to function as an internal learner. This finding is especially significant in the preschool years, when children are between 3- and 6-years-old because during this time period children experience increasing development and activity in the prefrontal cortex that is associated with self-regulation (Savina, 2014). Lillard el al. (2013) also highlight that although there are a number of studies that have examined the relationship between pretend play and children's language skills, previous studies have been methodologically limited, tended to focus on children younger than 3-years-old, and have not thoroughly addressed how pretend play might affect the language development of children with English as an additional language (EAL) (Fraser, 2007).

Saracho and Spodek (2006) draw further attention to the link between play and the development of children's literacy skills as it establishes opportunities for children to utilize their language and literacy skills. This link is particularly beneficial to children between the ages of 3- and 5-years-old as preschoolers have a broad variation in language and pre-literacy skills at this age (Weisberg et al., 2013a). In light of these findings along with other studies that outline the influence of pretend play on children's positive developmental outcomes, my study aims to examine the efficacy of a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- and 5-year-olds while considering the influence of age, gender, and EAL status.

1.1 The Study's Rationale

Pretend play commonly involves an individual who is consciously projecting a mental representation onto reality (Lillard at al., 2013). Pretend play can be either a social or solo activity that can overlap with other types of play. The current study extends from my Masters' dissertation that examined the representation of play within the home learning environment of 2.5- to 5-year-olds from South Asian families that had immigrated to England. More specifically, the study aimed to explore whether 11 South Asian mothers from India, Nepal and Pakistan utilize the ideas about play as outlined by the Peep Learning Together Program to support the home learning environment they create for their children. The delivery of the

Peep Learning Together programme across all the Peep sessions is governed by five principles: (1) believing in the potential of every parent and child; (2) believing that relationships are critical to learning; (3) recognising the tremendous work of parents and aiding them to further their efforts; (4) highlighting the potential of everyday learning experiences; and (5) noting the importance of understanding the perspective of others (Peeple, n.d.).

I used an exploratory approach in my Masters' project that involved three measures: (1) observations of children's play activities; (2) the Early Childhood Home Observation for Measurement of the Environment inventory; and (3) a questionnaire that gathered information about the frequency of children's exposure to various activities, and mothers' beliefs about their degree of playfulness and contribution to their children's learning environment. The study's findings demonstrated that although the majority of the participants had a mid to high quality home learning environment and the children engaged in a variety of play activities, the mothers regarded play and learning as two separate concepts that did not overlap. The mothers also noted that pretend play did not necessarily contribute to their child's learning environment.

Based on the results of my Masters' study, the present study included children from low-income households from a city in the north east of England. Children from six reception classes in three schools participated in the study, and due to unforeseen circumstances, the data collected was analyzed in two parts: (1) data from all three schools; and (2) data from Schools II and III. Furthermore, knowing that the early skills have a strong influence on children's performance in later years (McClelland et al., 2007), the design of the pretend play intervention with a guided approach has been particularly targeted to young children. The children were randomized into two groups: (1) guided play intervention with elements of pretense which is the experimental group; and (2) art activities which is the active control group. A third passive control group was also included in the study, and the children in this group were exposed to the typical curriculum.

1.2 Outline of the Design of the Intervention

In short, the design of the intervention was based on three components: (1) shared storybook reading with explicit phonological awareness and vocabulary instruction; (2) engaging in roleplaying or art activities depending on the group the children were randomized to; and (3) reviewing the first two components of the intervention with the children. The children were assessed at two time points, pre- and post-intervention, using various direct

measures of children's self-regulation and language skills. Blair et al. (2005) define self-regulation as the children's ability to adapt to developmental demands including emotional and inhibitory control, controlling impulsive behaviour, maintaining social relations, and attentional control in school. Given that measures to assess children's self-regulation skills often have working memory demands (Carlson et al., 2002), my study also explored this relationship as well as how working memory relates to children's language and pre-literacy skills. Additionally, there is a gap in the literature regarding the correlation of teacher reports and direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. Accordingly, my study examined this aspect as well as the teachers completed an evaluation of the children's self-regulation, phonological awareness, and expressive vocabulary skills over the duration of the intervention.

Finally, my study sought to gather parents' perspectives regarding the concepts of play and learning. This aim is supported by Fisher et al. (2008) who highlight a gap in the publication of research involving parental beliefs, which is especially significant given the profound role that parents have on the development of children. Building on my Masters' study, I provided parents with the opportunity to define the concept of *play* and *learning* so as to provide a better context for the parents' responses. In addition, since it is vital to examine the influence of the cultural context on children's developmental outcomes, the study asked parents to complete a questionnaire that provided details about the family's cultural context whilst also inquiring about other possible explanatory variables including the family's socioeconomic status (SES), age of the parents and child, child's gender, family composition, languages spoken at home, parents' level of education and employment status, parents' marital status, ethnicity, frequency of home reading, length of stay in the UK, and prior childcare experience.

1.3 Research Questions

The study aimed to answer the following five research questions:

1. What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?
    - What are children's self-regulation, language, and pre-literacy skills at baseline?
    - Are age, EAL status, and gender associated with children's self-regulation, language, and pre-literacy skills at baseline?
2. What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?

- Do the results differ amongst the experimental group, active control group, and passive control group?

3. What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?
    - Do the correlations differ depending on the area of children's development – self-regulation, phonological awareness, and expressive vocabulary?
4. What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?
    - Is children's exposure to pretend play activities in parent-child interactions similar to their opportunities to engage in other types of play such as object or physical play?
    - Is children's engagement in pretend play activities influenced by gender or cultural background?
5. What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?
    - What are parents' perceptions about the concept of pretend play?
    - Is there a relation between the type of play activity and parents' perception about its relation to the development of children's self-regulation, language, and pre-literacy skills?
    - Is there a relation between parents' perceptions about pretend play and the nature of children's exposure to play activities?

1.4 Structure of the Thesis

The dissertation is organized into seven chapters to address the study's research questions. *Chapter One*, the current chapter, provides an overview of the study. *Chapter Two* presents a selective review of the psychological literature regarding the relationship between pretend play and children's self-regulation, language, working memory, and pre-literacy skills. This chapter also provides the rationale for using an interventional design with a guided play approach with elements of pretense . *Chapter Three* describes the methodological framework of the study. *Chapter Four* illustrates the findings of the two pilot studies that were conducted and briefly highlights the practical constraints in the research process. *Chapter Five* analyses the data collected from all three schools exploring the relationship between children's self-regulation and language skills at baseline, and the efficacy of the guided play intervention. *Chapter Six* analyses the data collected from Schools II and III exploring the relationship between children self-regulation, language, working memory, and pre-literacy skills at baseline,

the efficacy of the guided play intervention, and the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. *Chapter Seven* provides the general discussion and conclusion of the study while outlining the study's key contributions, reflections, implications, and future directions.

Chapter Two

Literature Review

The relationship between pretend play and children's self-regulation, language and pre-literacy skills is under-researched (Berk, 2001; Smith, 2013). My study aims to examine the efficacy of a guided play intervention with elements of pretense on the self-regulation, language and pre-literacy skills of preschool children between 4- and 5-years-olds and particularly focuses on children with EAL. As such, this literature review chapter is divided into six sections: (1) explanation of the concept of play; (2) explanation of the contribution of pretend play to children's development; (3) the relationship between pretend play and children's self-regulation, language, and pre-literacy skills: how they are developed and measured for 4- to 5-year-olds; (4) the influence of culture capital on children's self-regulation and language development; (5) the importance of conducting play-based research within the cultural capital; and (6) discussion about the rationale for conducting the study including the interventional design, and the research questions and hypotheses.

2.1 What is Play?

My focus for this thesis is on human play during childhood. Play is difficult to define especially since there is no consensus amongst play theorists on one definition. There are different types of play such as exploratory play, object play, outdoor play, physical play, pretend play, and rough-and-tumble play. Play is usually intrinsically motivated, and it is an activity that is done for its process and not usually for its outcome. Children typically express joyous emotions during play and become engaged in the activity which usually continues for some time (Gauntlett et al., n.d.; Lillard et al., 2013). By immersing themselves in play activities, children have the opportunity to create their own world with its unique conditions and values that are in contrast from reality. Children can also use their language skills and share the world they have crafted with their peers. Additionally, children have the opportunity to practice their negotiation skills during play activities as their interplay is complex. Children's learning does not solely depend upon themselves but is also affected by the environment and the relationships they build. Children are able to learn best when the topic captures their full attention, which occurs frequently during play. Hence, play becomes a learning resource that is particularly inseparable during pre-school. Children can learn from their peers who have varying experiences or differ in age, thereby challenging their learning during play. It is during these thought-provoking experiences that arise during play that

children have a possibility to experiment with, expand, and change the play world they have constructed.

There has also been extensive debate over the benefits of children's participation in free play versus guided play activities. Free play consists of child self-directed joyful activities that often involve an imaginative component without an external goal (Fisher et al., 2013). Conversely, guided play comprises adults supporting the activity while making sure that it continues to be child-directed (Cavanaugh et al., 2017). Guided play can take two forms – adults designing the setting and adults interjecting during the child-led activity (Weisberg et al., 2016). In the first instance, guided play involves a setting that is designed by the adult to focus on a specific learning goal while providing children with an opportunity to maintain their autonomy and explore their surroundings. The second form of guided play involves adults gently interjecting during a child-directed activity by making comments, encouraging the children to pose questions, or further extending children's interest in the subject matter.

Prior studies have shown that providing children with a chance to engage in guided play activities contributes to the learning process and could enhance children's academic outcomes (Weisberg et al., 2013a). For example, Roskos and Christie (2013) highlight that when children are given props related to the story following shared storybook reading with an adult, they are able to engage in literacy-guided play. This engagement in literacy-guided play allows for the improvement of children's vocabulary and language skills. This learning opportunity is likely possible as guided play provides children with a chance to become active-learners, captures their attention as the activity is driven by the children's own interest, conveys information in a meaningful manner, and allows for social interaction (Hassinger-Das et al., 2017; Zosh et al., 2018). All of these aspects have indicated that guided play activities are effective for children's learning. Table 1 differentiates between free play and guided play.

Table 1

Free Play versus Guided Play

Free Play	Guided Play
• Child self-directed joyful activities without an external goal	• Child self-directed joyful activities with an external goal that is supported by adults • Two roles of the adults: 1. Designing the setting 2. Interjecting during the child-led activity

Nonetheless, play has taken a backseat in schools as there are higher demands on children's assessments, mandated benchmarks and scripted curricula. There is a tendency in schools to emphasize children's cognitive development and consequently, the whole child approach that also recognizes the importance of children's social and emotional development receives less attention (Hirsh-Pasek et al., 2009). Nevertheless, a variety of studies have demonstrated the contribution of play and play-based learning to the development of children's skills including collaboration, communication, confidence, creative thinking, and children's academic outcomes (Golinkoff & Hirsh-Pasek, 2016; Siraj-Blatchford, 2009; Zosh et al., 2018).

It is essential to distinguish between play and play-based learning. Play is an open-ended and pleasurable activity that is focused on the process and not the outcome (Pyle & Danniels, 2017). Play-based learning on the other hand involves a play activity that caters to a learning goal. Even so it is crucial to recognize that the evidence to endorse the advantage of play-based learning is weak and inconsistent (Education Endowment Foundation, 2018a). Prior studies suggest that play-based learning approaches enhance children's early learning outcomes by around five added months on average. These improvements have been seen in children's early numeracy, reasoning and vocabulary skills. However, the findings in regard to children's early language and problem-solving skills are mixed. Guided play falls under the category of play-based learning. This thesis particularly focuses on one type of play- *pretend play*- and uses the guided play approach, which will be explained in the next sections.

2.2 What is Pretend Play Specifically?

Pretend play is referred to by many terms such as dramatic, fantasy, imaginative, make-believe, pretend, sociodramatic, and symbolic play (Rowe, 1998). In most cases pretend play includes a pretender who is consciously projecting a mental representation onto reality.

Studies have highlighted that pretend play particularly fosters the development of children's verbal, vocabulary and language comprehension skills (Pyle et al., 2018; Weisberg et al., 2013b). Pretend play also allows for the development of children's self-regulation skills. In the study conducted by Colliver and Fleer (2016) that investigated teachers', mothers' and young children's perspectives on learning through play, the results noted that when children engaged in pretend play activities, they learned and believed the rules that were associated with the pretense scenario.

Researchers in the area of pretend play typically tend to refer back to Piaget and Vygotsky's perspective regarding its role in children's development as they have been accredited as "major theorists who have helped us understand the interactions of literacy and play" (Saracho & Spodek, 2006, p. 708). According to Piaget (1960) pretend play functions as an index rather than a promoter of development, which permits the child to distinguish an idea from its referent. Piaget noted that pretend play provides children with the opportunity to consider the broader picture and by doing so, causes children to begin to think logically and create mental representations of reality that consider the past, present, and future (Berk, 2001). Piagetian theory suggests that playing does not equate learning (Wood & Attfield, 2005) rather the development that arises as a result of children's engagement in pretend play activities is accredited to children's use of language (Berk, 2001; Roskos & Christie, 2011). Moreover, Piaget claims that until the age of three, children are not able to engage in pretend play activities with a partner because the directionality of the development of pretend play extends from individual symbols to social play that incorporates shared understanding.

Although Piaget's theory did note that interactions amongst children allow for higher levels of pretense, the majority of his work regarding pretend play was concentrated on solitary play (Saracho & Spodek, 1998). This in turn leads to the work of Vygotsky that conversely focused on the social aspect of pretend play. Vygotsky (1986), contrary to Piaget's perspective, recognizes pretend play as critical to children's, particularly preschoolers', development of self-regulation, language and literacy skills, and allows for the broadening of their *zone of proximal development*. The zone of proximal development is established when a mature adult provides support as the child engages in a task that offers an appropriate level of challenge. This sociocultural exchange forces the child to comprehend the adult's viewpoint, and in doing so permits cognitive development. Pretend play according to Vygotsky has great influence on 3- to 5-year olds' thought process, engages them in challenging skills beyond their average age, and creates opportunities for them to gain culturally valued competencies (Roskos & Christie, 2011, 2013; Vygotsky, 1986). Development in this area is particularly

facilitated when children are capable of using language skills to participate in pretense, which allows for rich collaborative dialogues (Bodrova, 2008; Roskos & Christie, 2011; Vygotsky, 1986). Vygotsky elaborates that engaging in pretend play allows for the development of literacy skills such as reading and writing because children are able to practice using them in a meaningful context.

Vygotsky (1986) argued that there are two elements that differentiate pretend play from other activities that children partake in – children are able to distinguish mental representations from the physical entities they represent and children are able to acquire and enact the rules of social life. In the former case, pretend play is an exercise that builds on strengthening children's internal capacity for it enables children to use symbols as tools for self-regulation in managing their behaviour and overcoming impulses (Berk et al., 2006; Roskos & Christie, 2007). In terms of pretend play enabling children to learn and enact the rules of social life, Vygotsky highlights that pretend play is a rule-based activity because while engaging in such activities, children draw on their familial and societal experiences that result in their behaviour complying with society's expectations (Berk et al., 2006). Table 2 includes comparisons of Piaget's and Vygotsky's theories regarding the influence of pretend play on children's development.

Table 2

Comparison of Piaget and Vygotsky's Perspectives regarding Pretend Play and Children's Development

Piaget	Vygotsky
• Focused on the solitary aspect of pretend play • Pretend play functions as an index of development and the child is able to distinguish an idea from the object it is referring to • Pretend play provides children with the chance to consider the bigger picture. Consequently, children begin to think logically and create mental representations of reality • The development in children's cognitive skills when engaging in pretend play activities is due to the children's use of language	• Focused on the social aspect of pretend play • Pretend play is critical to preschoolers' development of self-regulation, language and literacy skills. It broadens their zone of proximal development • Pretend play influences the thought processes of 3- to 5-year-olds, engages them in challenging skills beyond their average age, and allows them to gain culturally valued competencies • The development in children's cognitive skills when engaging in pretend play activities is facilitated when children use their language skills to participate in pretense

There are blatant differences between the Piagetian and Vygotskian theories concerning the role of pretend play on children's development as shown in Table 2. These differences include Piaget's emphasis on representation versus Vygotsky's view on social interaction, and the extent to which pretend play contributes to children's developmental outcomes (Piaget, 1960; Saracho & Spodek, 2006; Vygotsky, 1986). Despite the lengthy time that has elapsed since Piaget and Vygotsky initially proposed their theories, current literature surrounding pretend play and children's development tends to align more with one theory or the other (Bodrova, 2008). Bodrova stresses that this occurs in spite of the transition in cognitive science to dynamic, multidisciplinary perspectives. Roskos and Christie (2011) add that although both Piagetian and Vygotskian theories touch upon the social context to different degrees, they still fail to note the impact of sociocultural variation on children's early engagement in symbolic play. The researchers argue that the theories also do not examine the effect of ecological resources such as the opportunities for play that are available to the children, and whether a bidirectional relationship exists between the children and their environment.

Roskos and Christie (2001) state that this point of contention between the Piagetian and Vygotskian theories has to a certain degree skewed the research findings in this area, and the theoretical base would benefit from the inclusion of other theories such as Bronfenbrenner's ecological theory. A key aspect of Bronfenbrenner's theory is that the relationship between the person and environment is bidirectional, and can have direct and indirect effects (Saracho & Spodek, 2006). Specifically, in regards to play, Bronfenbrenner theory suggests that the environment and societal beliefs of play contribute towards children's learning, and play provides the setting for children to practice individual literacy concepts and skills (Roskos & Christie, 2013; Saracho & Spodek, 2006). Nevertheless, both Piaget and Vygotsky's theories have provided the basis that pretend play acts as a medium for children's development of skills in the areas of self-regulation, language and literacy. The design of the guided play intervention with elements of pretense used in this study was based on the theoretical framing of the aspects of Vygotskian theory, where the development of children's skills is influenced by the social aspect of play.

The next section will examine the role of pretend play on children's self-regulation, language and pre-literacy skills by presenting empirical studies in this area.

2.2 The Relationship between Pretend play, Self-Regulation, Language and Pre-Literacy Skills

Cheng and Johnson (2010) conducted a systematic review of studies published between 2005 and 2007 that focus on children's play. The findings of the study by Cheng and Johnson demonstrate that there is a gap in the literature in this area as the topic about children's play has not received much attention in peer reviewed publications. Lillard et al. (2013) further contributes that there is particularly a lack of studies that examines the relationship between pretend play and the development of children's self-regulation skills. Moreover, Lillard and colleagues emphasize that previous studies that have explored the effect of pretend play on children's development have been methodologically limited: replication and randomization were not conducted, the sample sizes were very small, only a limited number of confounding factors were examined, experimenter blinding was not utilized, the control conditions did not necessarily reflect pretend play, and the rationale for the statistical analysis was not explained for the majority of the studies. Consequently there is need for increased research on pretend play and 4- and 5-year-olds self-regulation, language, and pre-literacy skills especially involving large and diverse samples, improved methodologies and key constructs with standardized definitions (Berk & Meyers, 2013; Lillard et al., 2013). Bearing in mind these limitations and the need for research in this area, the upcoming sub-sections will present Piaget's and Vygotsky's theories on the development of self-regulation and language skills and will describe empirical studies that aim to highlight the relationship between pretend play and the development of children's self-regulation, language, and pre-literacy skills. Each of the upcoming sections will be divided into two parts. First, I will describe what is known about how self-regulation, language and pre-literacy skills improve in childhood and second, I will provide details about how these skills have been measured in children.

2.2.1 Why focus on the development of children's self-regulation skills? Self-regulation is commonly referred to as the ability to control one's behaviour, cognitive processes, emotions and thoughts while facing external pressures or impulses when pursuing a self-chosen state or goal (Bauer & Baumeister, 2011; Buckner, Mezzacappa, & Beardslee, 2009; Diamond & Lee, 2011). Whitebread (2018) expands that self-regulation also involves identifying errors and rectifying them and focusing and maintaining attention, which has been shown to predict children's cognitive ability, and their emotional wellbeing. Both Piaget and Vygotsky agree that self-regulation forms the basis for mastery of higher cognitive processes (Berk, Mann, & Ogam, 2006). According to Bronson (2000), Piaget's model of cognitive

adaptation views self-regulation as intrinsic to the mind. Self-regulation serves as a means for optimally adapting to the external environment. The complementary processes of *assimilation* and *adaptation* are automatically self-regulated, and are proposed to increase both quantitatively and qualitatively with cognitive development (Bronson, 2000). Assimilation refers to the process when information is integrated into *schemas* or existing mental structures as the incoming information from the environment is considered to be consistent or fairly similar to the prevailing mental structures (Piaget, 1960). However, according to Piaget in the case that the incoming information is inconsistent or conflicts with the relevant *schemas*, revision of existing mental structures or construction of alternate structures are required to accommodate the new incoming information. Vygotsky too accredited the child's desire for control but also highlighted the effect of the sociocultural environment in influencing self-regulation. According to Vygotsky, children's curiosity and desire for independence are the sources for self-regulation (Bronson, 2000). Vygotsky elaborated that the development of children's self-regulation skills is largely attributed to the decline and eventual disappearance of egocentric speech as the internalized language now serves as a guide for children's actions and thought (Bronson, 2000; Karpov, 2005). This opportunity for development is particularly noted as the child engages in pretend play.

In terms of how children's self-regulation skills improve in early childhood, Bunney, Zink, Holm, Billington and Kotz (2016) emphasize that children who are between 4- and 7-years old can experience a shift in their self-regulation skills from reactive behaviour to cognitive behavioral forms of self-regulation largely due to their ability to integrate their executive function (inhibitory control, attention shifting, and working memory) and language skills (Diamond, Kirkham, & Amso, 2002). Cross sectional studies have shown that children experience a rapid improvement in performance on tasks that involve the integration of numerous executive function skills into behaviour (Bunney et al., 2016). There is also wide variation in children's self-regulation skills during this timeframe, and self-regulation is predictive of children's school readiness and academic achievement in the short- and long-term (McClelland, Acock, Piccinin, Rhea, & Stallings, 2012). Diamond emphasizes that in early childhood between the ages of four and seven, children have non-linear growth in their self-regulation skills with rapid increases followed by a period of enhancement in performance but the rate of improvement decreases. Children's self-regulation skills are also linked to whether the activity that the child engages in is adult-led or child-initiated. Children demonstrate higher levels of self-regulation when the activity is child-initiated, and adults are absent (Robson, 2015, 2016).

The development of self-regulation skills is affected by other child factors (e.g., gender, language skills). Prior studies have shown that girls have higher self-regulation skills than boys between the ages of four and seven (Matthews, Ponitz, & Morrison, 2009; Matthews, Marulis, & Williford, 2014; Mcclelland et al., 2007) but the reason for these gender differences remains unclear. Wanless et al. (2016) hypothesize that these gender differences may be attributed to cultural beliefs and expectations. In addition to gender, children's language skills also affect the development of their self-regulation skills. As per Vygotsky (1986), language provides children with the mental tools that allows for the organization and modification of their thoughts and behaviors. During early childhood, expressive language particularly may increase the chances for the child to recognize their own state of mind and manipulate it to the specific context and task requirements that the child is dealing with (Cole et al., 2010). Early expressive language skills are associated with higher levels of self-regulation skills in early childhood (Bohlmann, Maier, & Palacios, 2015) particularly when the children are engaged in play activities (Whitebread, 2018). This occurs as play activities provide children with the opportunity to collaborate with their peers (Robson & Flannery Quinn, 2015), communicate their ideas, explain their reasoning and share their learning experiences, which in turn improves their self-regulation skills (Pino-Pasternak, Basilio, & Whitebread, 2014). Whitebread (2018) elaborates that a warm and playful environment that allows children to explain their thought processes and simultaneously challenges them, promotes the development of their self-regulation skills. The upcoming paragraphs will note how children's self-regulation skills have been measured in children between 4- and 6-years-old in empirical studies that have examined the influence of pretend play.

Although there is growing interest in the area of play and children's cognitive development, there are limited studies that have empirically investigated the influence of pretend play on children's self-regulation skills. Timmons, Pelletier, and Corter (2016) conducted a study in the Greater Toronto Area in Ontario, Canada and one of the study's aims focused on how children's self-regulation and engagement differed depending on the kindergarten classroom context. Play-based learning was incorporated into the study's design as the four classroom contexts included in the study were whole group, small group, transition, and play. The study's sample included 4- to 5-year-olds, 16 females and 24 males ($N = 40$). The researchers conducted direct observations consisting of continuous running records for 10-minute periods in each of the four classroom contexts for a total of 40 minutes per child. In terms of the measurement of children's self-regulation skills, the child

observation framework was used to assess the children's self-regulation behaviors. The study's results indicated that children in small groups and in the play context had higher self-regulation scores than children in the whole group and transition context. Although the study by Timmons et al. focusses on play in general as opposed to pretend play specifically, the results highlight the opportunity for engaging in self-regulation behaviors during play, and in alignment with other studies (Calkins, 2007; McCain, Mustard, & McCuaig, 2011) demonstrate the importance of conducting further research in this area with young children.

Similar to the aims of the study by Timmons et al. (2016), Elias and Berk (2002) examined the effect of play on children's development of self-regulation but specifically focused on pretend play. Elias and Berk also controlled for children's verbal ability because it may influence children's ability to communicate during pretend play and may influence children's ability to self-regulate their behavior. The study's sample consisted of 3- and 4-year-olds ($N = 51$) that were Caucasian, native English speakers and hailed from middle to upper-middle income families in the United States of America (USA). Elias and Berk conducted observations in four classrooms, all of which were equipped with play stations such as housekeeping and Legos that children had access to during free play periods. The teachers encouraged the children to engage with different play stations on a daily basis to ensure that they had exposure to the variety of possibilities available.

Several measures were used in the study by Elias and Berk (2002) including pretend play observations of children's participation at the play stations, which were coded using the Smilansky Scale (Smilansky & Shefatya, 1990). In addition, children's self-regulation observations were assessed at two time points – shortly after the commencement of the school year and four to five months after the first time point. Also, in order to control for the effect of children's verbal ability on both children's engagement in pretend play activities and their self-regulation skills, the Vocabulary subtest of the Wechsler Preschool and Primary Scale of Intelligence- Revised (Wechsler, 1989) was used. The results indicated that children's language skills were related to their total pretend play frequency and age was significantly related to children's self-regulation skills (Elias & Berk, 2002). Additionally, the children's engagement in complex pretend play activities positively predicted their self-regulation skills, but children's total engagement in pretend play activities irrespective of complexity did not have a significant relation with self-regulation measures. This finding is consistent with the review by Zosh et al. (2018) that note that there is an association between pretend play and children's self-regulation skills but more data are necessary to further examine this relationship. The results suggest the need for further research in this area with a greater focus

placed on the quality of pretend play activities as opposed to children's total engagement in pretend play activities.

There has been much discussion in the literature surrounding the directionality of the relationship between children's self-regulation and language skills particularly as it relates to children's EAL status. Bohlmann et al. (2015) examined the possible bidirectionality between preschoolers' expressive vocabulary and self-regulation skills among native English speaking and EAL preschoolers. The study was conducted in a western region of the USA and comprised native English speakers and children with EAL ($N = 250$) who were assessed at three time points: (i) in autumn; (ii) in the spring; and (iii) in autumn the following year. The Peabody Picture Vocabulary Test (Dunn & Dunn, 1997) or the Test de Vocabulario en Imagenes Peabody (Dunn, Dunn, & Arribas, 2006) and the English and Spanish versions of the Woodcock–Johnson/Woodcock–Munoz Picture Vocabulary subtest was administered in the child's native language (English or Spanish) to assess children's expressive vocabulary skills. The Pencil Tap (Blair, 2002; Diamond & Taylor, 1996) and the Toy Sort (Brock, Rimm-Kaufman, Nathanson, & Grimm, 2009) tasks were used in English or Spanish to assess children's self-regulation skills depending upon whether the children had higher scores in the Peabody Picture Vocabulary Test or the Test de Vocabulario en Imagenes Peabody. The study's results indicated that in the case of preschoolers, there was a bidirectional relation between self-regulation and English expressive vocabulary skills. These results emphasize the importance that when conducting research on the impact of pretend play on children's self-regulation skills, it would be beneficial if children's expressive vocabulary skills were also included in the study.

Carlson et al. (2002) highlight the importance of considering how the tasks used in studies to assess children's self-regulation skills affects children's working memory demands. Baddeley (1992) define working memory as the temporary storage of information which in turn enables the individual to manipulate the information as it is cognitively processed. Carlson et al. used the Bear/Dragon, Whisper, and Gift Delay tasks (Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996) to assess the self-regulation skills of 3- to 5.5-year-olds. The Counting and Labeling (Gordon & Olson, 1998), Backward Digit Span (Davis & Pratt, 1995), and Backward Word Span (adapted from Davis and Pratt, 1995) tasks were used as working memory measures. The results indicated that conflict self-regulation tasks such as the Bear/Dragon and Whisper not only require the use of self-regulation skills but also have high working memory demands as the children have to also demonstrate the conflicting response while suppressing an inappropriate response. However, delay self-regulation tasks

such as Gift Delay only require the children to inhibit a response, thereby having a lower working memory demand than that of the conflict tasks. Hence, children's working memory skills may be a covariate in the relationship between play and children's self-regulation development.

2.2.2 Measurement of children's self-regulation skills. McClelland and Cameron (2012) highlight that a lot of the research on children's self-regulation skills has utilized teacher reports but these reports are subjected to observer bias. There are direct measures of children's self-regulation skills, but they are often not suitable for school-based research as they are intended for laboratory or clinical settings or are sections of longer batteries that would be difficult to administer in a school setting. Moreover, several assessments involve the use of specialized materials and considerable investments of time that are especially arduous to administer in a school setting. Additionally, a limited number of measures of children's self-regulation skills are designed for multilingual populations and for use with 4- to 6-year-olds. For example, the Head, Toes, Knees and Shoulders Task (Diamond et al., 2002; Mcclelland et al., 2014) is a measure that is quick, simple to use and suitable for 4- to 6-year-olds. The Head, Toes, Knees, and Shoulders Task involves four behavioral rules that are paired- 'touch your head', 'touch your toes', 'touch your shoulders', and 'touch your knees'. This task assesses the children's self-regulation skills as they first have to respond naturally and then respond in an alternate way. The Head, Toes, Knees and Shoulders Task also includes practice trials. The inter-rater reliability and the test-retest reliability of the Head, Toes, Knees and Shoulders Task is high and has alphas of .93 over a 3-month period. In terms of the predictive validity, the task indicates moderate to strong effect sizes for achievement levels and gains.

It is imperative that the measures used in studies reflect the context in which the behaviour is being observed (McClelland & Cameron, 2012). For example, the assessments that researchers apply to measure children's self-regulation skills should be aligned with their learning context. The tapping task (Diamond & Taylor, 1996) is another measure that can be used to assess young children's self-regulation skills. The children are required to follow two stick-tapping rules that involve inhibiting one's natural response: (1) Tap a stick once on the table if the experimenter taps the stick twice; and (2) Tap a stick twice on the table if the experimenter taps the stick once. The tapping task involves two practice trials and 16 tests trials that are in a fixed random order. Delay Tasks (Kochanska et al., 1996) can also be used to assess young children's self-regulation skills. These tasks require the children to lessen or delay a natural response or resist short term temptation for a larger delayed reward such as the

case with the delay of gratification task. Most self-regulation tasks involve verbal instructions, which makes it difficult to differentiate if the scores of children with EAL are a true reflection of their self-regulation skills or if the results reflect the children's possible misunderstanding of the tasks' instructions. More research needs to be conducted to develop measures of children's self-regulation skills that can be used in school-based settings with multilingual 4- to 6-year-olds.

2.2.3 Why focus on the development of children's language and pre-literacy skills? The discussion on the development of children's language skills will largely focus on the theories of Piaget and Vygotsky because aligned with their perspectives, pretend play facilitates children's cognitive development through children's use of language skills (Berk, 2001; Roskos & Christie, 2011, 2013; Vygotsky, 1986). Piaget (1960) described children's interest in exploring and discovering their environment as a critical feature that allows for the natural course of development that extends to acquiring language skills. Vygotsky (1986) shares this idea and expresses that the innate basic attentional, memory, and perceptual capacities of children develop as children interact with their environment. This development is facilitated during pretend play. Imitation is also central to children's development and enables them to learn new skills (Piaget, 1960; Vygotsky, 1986). These capabilities mediated by self-regulation permit children to begin to grasp language skills that tend to accelerate after children are one-year-old (Berk, 2001).

According to Vygotsky, most children can be considered to be skilled conversationalists between 2- and 3-years-old. By the age of six, a majority of children are able to utilize the grammatical rules of language correctly which coincide with their increase in vocabulary that can extend up to 10,000 words (Vygotsky, 1986). Although the natural process of development provides the opportunity for children to advance their language skills (Piaget, 1960), there are factors such as sociocultural interaction that support this progression. Aligned with Vygotsky's notion of the *zone of proximal development*, as children engage in dialogue with adults during which the conversation is slightly more advanced than the child's present level of functioning, it creates the *zone* for development to occur (Berk, 2001; Vygotsky, 1986). When children engage in pretend play, it provides opportunities for them to broaden their zone of proximal development. Berk adds that the process of development is encouraged during spoken language as it provides chances for attaining shared understanding that in turn allows for increased clarification of the role of the participants in the dialogue. Consequently, through the sociocultural interaction, such as participating in pretend play,

children are better able to internalize the interaction and in doing so, can advance their language skills.

In addition to Piaget's and Vygotsky's perspectives, Dockrell & Marshall (2015) describe language as a representational system that develops as children's cognitive skills including attention, perception, memory, and reasoning skills support their organization and understanding of the world. Thereby children are able to comprehend the rules of language, understand the meanings of new words, the requirements of social interactions and the perceptions of others. The language system consists of many subcomponents including lexicon, syntax, morphology, phonology and pragmatics that all together are vital for children's effective communication and understanding. As children's language skills improve, they are able to produce coherent and extended oral narratives that enable them to communicate effectively with others.

Additionally, Hassinger-Das et al. (2017) suggest that there are six principles of language development that can be applied irrespective of age, EAL status, and SES: (i) *Frequency* as children learn through repetition; (ii) *Interest* as children learn vocabulary for items and experiences that capture their interest; (iii) *Contingency* as children build upon their language skills by engaging in interactive and responsive environments; (iv) *Meaningfulness* as children are best able to learn when immersed in meaningful contexts; (v) *Diversity* as children benefit from exposure to a variety of words and language structures; and (vi) *Reciprocity* as the development of grammar, narrative and vocabulary skills are reciprocal processes. All of these six principles broadly influence children's learning and retention of information and are available by partaking in pretend play activities.

Furthermore, there are long-term benefits for early language instruction especially in the case of disadvantaged children. For instance, McLeod, Hardy, and Kaiser (2017) highlight that children who begin the first years of schooling with lower vocabulary skills than those of their peers are at risk for reading problems in the later years. Additionally, children from low-income households are at risk of experiencing language and reading delays as a result of parental education, income and involvement that have been shown to influence general academic outcomes. Consequently, the use of interventions in primary schools are imperative to reduce the discrepancy in young children's vocabulary skills.

Moreover, there have been a number of empirical studies such as that by Rowe (1998) that have examined the effect of pretend play on children's language, and literacy skills. Rowe utilized a qualitative approach to explore the role of pretend play as brought about by

book reading on children's literacy learning. The study included 2- and 3-year-olds from Caucasian middle-class families in the USA ($N = 16$) that were observed in their preschool classroom over nine months. These preschool students were compared to the researcher's own son who was a 2-year-old, and his experiences of pretend play as brought about by book reading on children's literacy learning were recorded as they unfolded in the home environment over a 13-month period. Both the preschool and home observations were related as the researcher's son was a student in the preschool class included in the study. Rowe also conducted informal interviews with the participants. The results of the study indicated that all the children in the study tended to engage in pretend play that involved acting out favorite parts of the book, problematic sections of the book, and posing questions that aimed to explore the world (Rowe, 1998). The scenes that the children chose to recreate were either rooted in the storyline outlined in the book or they chose to use improvisation instead. Rowe, through using books as a prompt, showcased that pretend play can function as a medium for the development of children's language and literacy skills, and the process is particularly beneficial to children's learning.

2.2.4 Measurement of children's language skills. The language skills of 4- to 6-year-olds are frequently assessed either as a component of the curriculum to ensure children are developing their skills appropriately or as part of a screening process (Dockrell & Marshall, 2015). The assessment of children's language skills can also be utilized to evaluate the efficacy of oral language interventions using pre- and post-intervention measures. Standardized tests, composite language measures, vocabulary measures, and checklists can be used to measure children's language development. First, standardized tests provide objective information of children's skills as their performance is related to normative data. These tests are available commercially and come under two categories: (i) Omnibus measures that provide oral language composite scores; and (ii) Measures that target specific components of the language system. The tests are standardized on specific and sometimes limited samples thereby noting with which samples it would be most appropriate to be used and the extent to which the results can be generalized (Hoffman, Loeb, Brandel, & Gillam, 2011).

Composite language measures can also be used to measure children's language development which are based on theoretical frameworks (Dockrell & Marshall, 2015). The Clinical Evaluation of Language Fundamentals-Preschool-2 (CELF-P2) is the most commonly used measure internationally (Andersson et al., 2019). The correlations for the validity for different subtests of the CELF-P2 range from .60 to .85. However, there is concern over the reliability of the Sentence Structure in the CELF-P2. Some composite

language measures also include a listening comprehension and oral expression scale such as the Wechsler Individual Achievement Test (3rd edition: WIAT-III) (Parkin, 2018) that has strong psychometric properties.

In regard to measuring children's vocabulary skills, usually forced-choice receptive measures are used but they provide limited details about children's vocabulary skills (P. J. Brooks, Kempe, Brooks, & Kempe, 2014). More complex measures that assess the breadth and depth of children's vocabulary skills ask them to provide oral definitions that present information about children's lexical representations (Dockrell & Marshall, 2015). The British Picture Vocabulary Scale III (Dunn, Dunn, Styles, & Sewell, 2009) is the most used vocabulary measure in the UK. Lastly, checklists can be used to measure children's language development in early childhood. They are usually completed by parents or professionals but many have not been validated in terms of their reliability and validity (Dockrell & Marshall, 2015). The Communication Development Inventories (Rubio-Codina, Araujo, Attanasio, Munoz, & Grantham-Mcgregor, 2016) are the best researched checklists of children's early language skills and have been translated into many languages. The use of parental report data as collected through checklists allows for a broader understanding of children's language skills and comes in handy when it is difficult to assess the children themselves (Dockrell & Marshall, 2015). Checklists are also advantageous to use as they are cost effective and no further training is required in order to administer them (Nordahl-Hansen, Kaale, & Ulvund, 2013). However, consideration needs to be given when analyzing the data as differences between respondents including their background may affect the responses provided (Pan, Rowe, Spier, & Tamis-Lemonda, 2004). The following section will draw attention to the role of culture capital on children's language development especially since my dissertation includes a large number of children with EAL.

2.3 Why include Children with EAL in my Study?

Yahya (2015) conducted a study that examined the views of mothers who immigrated to Canada with regards to play-based learning. This learning approach is used in schools within the province of Ontario, and the researchers wanted to understand whether mother's views were aligned with their own learning experiences and cultural capital, which is the familiarity with a culture within a society. All mothers who participated in the study had a child between 5- and 7-years-old ($N = 19$), and they themselves had experienced early education in countries where the medium of instruction was not in English. The mothers hailed from the countries in Africa, the Middle East and South Asia, and Yahya conducted a semi-structured interview with each mother that lasted for less than one hour.

Yahya's (2015) findings noted that the participants' cultural capital may have influenced their beliefs in terms of the relationship between play and learning, and their views on the play-based approach. The mothers recognized the benefit of the play-based learning approach especially in connection with "making learning a more meaningful and enjoyable experience" (Yahya, 2015, p. 10), particularly those that had experienced too much homework and hard punishment during their own early education. However, the mothers also voiced a lack of understanding of the play-based learning approach in terms of maximizing the child's learning potential at school, the preparation for higher levels of learning in subsequent school years, and lack of knowledge about supporting their child's learning using this approach. Furthermore, the results of the study by Yahya supported the inclusion of children from families with EAL as it emphasized the need for regular communications with parents that would allow for better connections between the home and school environments. This inclusion of children from families with EAL would be beneficial to both the parents and the schools, because parents would have the opportunity to gain knowledge about the relationship between play and learning, and the schools would gain a better understanding of the families' cultural capital that has been shown to influence children's learning.

Additionally, Yahya and Wood (2016) examined play as a third space that connects the discourse between home and school that are respectively referred to as first and second spaces. The sample consisted of mothers who had a child between 5- and 7-years-old ($N = 19$) and were immigrants to Canada, the majority of whom had completed a degree. Yahya and Wood engaged in interviews with the mothers, and engaged in conversation with the children as they completed a drawing activity (Yahya & Wood, 2016). Both mothers and children were asked a series of questions that inquired about the role of play and culture at home and school. The results suggested that play functions as a third space and acts as a medium to understand the possible difference in culture between the home and school. The results also suggested that in order to adapt to the culture of the school, the children may choose a playmate who shares a similar identity to them. These findings emphasize the importance of conducting my study because pretend play provides children, especially those from minority cultures with EAL, an opportunity to get accustomed to the school culture that may be different from their native country and could also allow parents to better understand the process of acculturation that their child's play may have undergone.

In terms of the benefits of a program that supports language development in children from families with EAL, one of the aims of the intervention study by Riley et al., (2004) was to examine the pattern of language development of reception children from various cultures in

two inner-city primary schools in the UK. Two-thirds of the children in the sample had EAL ($N = 51$). The children's language skills were assessed using three subtests for receptive language and three subtests for expressive language from the CELF Preschool UK (Andersson et al., 2019). The intervention was conducted by volunteers that included parents of the children or other adults that enjoyed working with and supporting the children's learning. The intervention consisted of theme or topic-based activities that were conducted in one-hour weekly sessions over a total duration of 12 weeks. The sessions provided the children with opportunities to use their language skills, particularly paying attention to the development of vocabulary and narrative skills. The results of the study indicated that all the children, including those in the control group, improved their language skills, although significant results were recorded for only one subtest of the CELF Preschool UK. The children experienced the greatest area of improvement in their expressive language skills, but the improvement in the children in the intervention group was greater than that of the control group. The findings support the need for developing programs such as the one in my study to allow for the development of language skills of children, particularly for those from families with EAL.

One of the aims of the study by Carlson and Meltzoff (2008) was to examine whether the self-regulation and expressive vocabulary skills of Spanish-English bilingual children are accelerated similarly to that demonstrated in other languages. The study recruited 5- to 6-year-olds and their parents ($N = 50$). The children's expressive vocabulary skills were assessed using the Expressive One-Word Picture Vocabulary Test – Spanish/English Bilingual Edition (Bullard, Griss, Greene, & Gekker, 2013), and numerous measures were used to assess children's self-regulation skills including Delay of Gratification (Jahromi, Chen, Dakopolos, & Chorneau, 2019), Dimensional Change Card Sort (Doebel & Zelazo, 2015), Simon Says (Strommen, 1973), the Statue Task (Korkman, Kirk, & Kemp, 2007), and the Gift Delay Task (Kochanska et al., 1996). Given the effect of age, SES, and verbal ability on children's performance, these factors were controlled for in the analysis.

The findings of Carlson and Meltzoff (2008) indicated that although the bilingual group was relatively disadvantaged in terms of lower parent education levels, lack of home-based reading and low SES, the raw scores were not significantly different, which is contrary to what is typically expected. Carlson and Meltzoff suggest that their study's participants may be making the best of their resources with regards to children's self-regulation and expressive vocabulary development, and when the analysis controlled for parent education and SES, the bilingual children performed significantly better than their monolingual peers. This finding

may possibly be attributed to the bilingual children's ability to capitalize on the cognitive processing involved in language switching thereby supporting the development of their self-regulation and expressive vocabulary skills. In addition, Carlson and Meltzoff noted that bilingual children performed significantly better than their monolingual peers on conflict self-regulation measures that require higher working memory demands than delay self-regulation measures. Hassinger-Das et al. (2017) also suggested that language production in turn supports the enhancement of children's working memory skills as well.

2.4 The Conceptualization of the term 'English as an Additional Language'

This section will focus on EAL conceptualization, including a problematization of the term and how it relates to multilingualism and multiculturalism. To begin with a definition of EAL as used within the English-speaking school system in the UK and other countries, Cortazzi and Jin (2007) outline that EAL refers to recent migrants or longer-term residents who speak a language other than English as their first or dominant language. EAL also refers to those students whose usage of English differs from those who use English as their first language. The term 'EAL' is used in the UK in place of terms such as 'limited English proficiency' or 'English as a second language' as those terms do not recognize the student's bilingual or multilingual skills whereas the term 'EAL' acknowledges the student's fluency in other languages as well as their learning of English. There are growing numbers of EAL students, with 10% of the UK student population comprising of EAL students, and in large cities such as London, about 30% of students have EAL.

It is important to recognize that the term EAL implies that these students will need language support and assistance in using English to access the curriculum, at least for a short time period (Cortazzi & Jin, 2007). The term EAL does not imply that the students fall into any specific ability range because sometimes this is falsely construed as limited cognitive ability which is problematic. Rather, all abilities are represented among the students irrespective of their EAL status. Students with EAL are not a homogenous group but are increasingly diverse in connection with the number and range of languages spoken, English proficiency, ethnicity, cultural, religious and social backgrounds. Consequently, support and development for children with EAL needs to consider how multiculturalism can be incorporated into the curriculum to address the needs of the diverse group of children.

Multiculturalism is incorporated in the UK curriculum, especially as it relates to students with EAL. Prior to multiculturalism, assimilation was common practice where English was used universally, there was insufficient support for multilingual studies, and the

curriculum was largely based on Eurocentric content (MacPherson, Ranya Khan, Hingley, Tigchelaar, & Lafond, 2004). This was disadvantageous to students with EAL and often resulted in cultural and linguistic assimilation. The change in mindset from assimilation to multiculturalism began in 1966, when Roy Jenkins, the then Home Secretary, described immigration as an equal opportunity that alongside cultural diversity, required an environment of mutual tolerance (Banks, 2008). Consequently, over the years, courses, seminars and workshops were promoted for teachers of immigrants and eventually led to the development of the Teacher Training Agency and the Office for Standards in Education (Fialová, 2011). Furthermore, in 2002, citizenship education was introduced in primary and secondary schools in the UK with the aim of incorporating multicultural and antiracist education. As a result, citizenship education focused on teaching students about cultural diversity, democracy, global community and tolerance. Additionally, educators and policy makers recognize the role of students with EAL in the multicultural agenda and as it relates to bilingual teaching, multicultural perspectives, and languages other than English (Polesel, 1990).

2.5 The Importance of conducting Play-Based Research within the Cultural Context

An important consideration when conducting research in the area of play is ensuring that play is examined within the cultural context, which is infrequent in the literature. The studies by Singer et al. (2009), Cote and Bornstein (2009), and Fraser (2007) respectively underline the importance of considering parents' perspective on play, the influence of gender on children's play participation, and the benefit of teachers using pretend play in the classroom. First, Singer et al. surveyed mothers in 16 countries in North America, South America, Africa, Europe, and Asia using telephone or face-to-face interviews with one of the aims being to inquire about the manner by which their children spend their time when outside of school or the day-care setting. A total of 150 interviews were conducted in each of the 16 countries included in the study, and the mothers provided responses about their children that were between the ages of one and twelve. The questionnaire completed by the mothers inquired about 49 items regarding children's participation in a wide number of play activities that included pretend play. The questionnaire also gathered information about mothers' perspectives regarding the association of these activities with children's developmental outcomes.

Singer et al. (2009) analyzed the data by grouping the 16 countries into three categories based on their economic development. The results of the study noted the decline in children's participation in play activities, which was true for all 16 countries. In terms of children's participation in pretend play activities specifically, the results showed that with the

exception of children from Ireland, the UK, and the USA, engagement in pretend play activities is scarce. This infrequent involvement in pretend play could be associated with the mothers' responses, which suggested that pretend play does not necessarily lend itself to positive development outcomes for children. Another finding was the differences in the opinions of mothers regarding children's play activities across the various countries. Studies such as the one by Singer et al. that gather details about parental beliefs about play are rare but given their results, highlight that aside from their cultural differences there might be a discrepancy in mothers' understanding about the benefits of play, more specifically pretend play and its relationship to children's developmental outcomes.

Cote and Bornstein (2009) conducted a study that sought to examine the representation of play within three cultural groups in the USA itself. The study included 20-month-olds ($N = 113$) from Latin American, Japan American, or European American families. Home visits were conducted when the children were 20-months-old and involved a 20- to 30-minutes acclimation period followed by 10-minutes of the children playing by themselves, and 10-minutes of the children engaging in play activities with their mother. The children's engagement in play activities, both solo and in the company of the mother, were video recorded. The children's participation in exploratory and pretend play activities were coded, and the duration and frequency for each type of play was noted. The results of the study indicated that gender influenced children's participation in play activities as girls engaged in more pretend play and fewer exploratory play activities in comparison to boys. There were no significant effects found for cultural background or interactions involving cultural background. The study's results suggest that more research would be required to determine whether culture influences children's play activities.

Lastly, Fraser (2007) explored the cultural differences surrounding play, particularly pretend play, as it presented itself in the preschool classroom. The study was conducted in East Vancouver, Canada, which has a large multicultural population, and the sample comprised 4-year-olds ($N = 20$) mostly from families with Chinese or South Asian heritage. The study unfolded over a two-year period where during the first year, the children who were 3-years-olds were provided instruction with the aim of developing their skills to better allow for the representation of their ideas. Fraser only observed the children's engagement in pretend play activities over the course of the second year of the study, as the children were given props to engage in pretend play activities in their preschool classroom. The results highlighted that the children had developed play themes such as princesses, knights, and

dragons. Fraser also emphasized the benefit of teachers scaffolding the pretend play activity, which allowed for further development of their language and literacy skills.

The studies conducted by Singer et al. (2009), Cote and Bornstein (2009), and Fraser (2007) examined the cultural context of play but echoes the limitations of research in this area. First, none of the studies examined the effect of pretend play on children's self-regulation, language, and pre-literacy skills. Second, the lack of longitudinal studies in this area and those that involve assessment of children's skills make it increasingly difficult to gauge whether pretend play positively affects children's developmental outcomes. This gap in the literature is particularly significant in the case of preschoolers as during these years, children begin to use cognitive strategies such as self-regulation to control their behaviour, comply with societal and moral standards, and direct and monitor their thinking while pursuing self-chosen goals (Bronson, 2000). At this developmental stage, language has an important role as children use this skill to both regulate their actions, and as a means of interacting with others (Bronson, 2000; Lillard et al., 2013).

This finding is similar to that by Toub et al. (2018) that aimed to investigate whether word learning abilities of children between 3- and 7-years-old from low-income households would be improved by book-reading and subsequent engagement in play-based activities. They conducted two separate studies on the effectiveness of a play-based versus a direct instruction approach to support vocabulary learning during book-reading. The first study used three different approaches: (1) free play; (2) guided play; and (3) directed play. Children in all three groups received 10 minutes of book reading with explicit vocabulary instruction for which a script was created. Each book had 10 target words and the explicit vocabulary instruction included providing the children with a child-friendly definition and further conceptual details about the meaning of the words, gestures were encouraged, and the children were encouraged to look at the relevant pictures in the book. Following the reading of the book with the explicit vocabulary instruction, the story and the target words were reviewed using illustrations from the book, and picture cards were also used to review the target words. Following the review, the children in the free play group were given toys related to the story, they could play with the toys as desired and the adult actively supported vocabulary development. However, in the guided play and the directed play groups, the children were handed toys related to the story and the adult used scripted language while the children re-enacted the story.

The findings of Toub et al.'s (2018) first study noted that through play the children were able to engage with the words in a meaningful context that allowed for vocabulary development. Children in the guided play and the directed play groups made significantly greater gains in both the expressive and receptive vocabulary measures for the target words than the children in the free play group. There were no differences in the results for the children in the guided play group and the directed play group. The findings also indicated that maternal education was a statistically significant moderator of receptive and expressive vocabulary gains not home literacy exposure, home language or EAL status.

Study two in Toub et al. (2018) aimed to examine if children improve their vocabulary skills through book reading and adult-supported play when both activities are delivered by the classroom teachers. Additionally, the second study investigated whether the children learned more through book reading and adult-supported play as opposed to book reading and a more direct teaching approach to the target words. There were a few changes to the methodology of study one which included the increase of the target words from 10 to 16, and the play sessions included aspects of both the guided play and the directed play groups that were effective in study one. The intervention in study two spanned two weeks and comprised of numerous activities delivered by the classroom teacher including the four book reading sessions that consisted of Read + Play and Read + Picture cards with the whole class, four small group sessions that consisted of Read + Play with groups of three to four children and six whole class sessions of Read + Picture cards. The findings of study two showed that children learned words through both the Read + Play and the Read + Picture cards approaches; however, the Read + Play condition was more effective for vocabulary learning than the Read + Picture cards approach. Therefore, in terms of the application of the results from both study one and two to the classroom experience, Toub et al. suggest that a play-based intervention may be utilized to support the vocabulary skills of preschoolers, but more evidence is needed to support this finding.

This section has focused on the importance of considering the cultural context when conducting research that centers on play and children’s developmental outcomes. The previous sections have outlined the importance of focusing on the development of young children’s self-regulation, language, and pre-literacy skills and the further need for conducting research with children with EAL. All of these aspects informed the design of my study and will be expanded upon in the upcoming section.

2.6 The Present Study

My study aims to examine the efficacy of a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL. The following subsections will examine the importance of conducting research within the cultural context, argue the need for an interventional design, and provide the context for the five research questions and the corresponding hypotheses.

2.6.1 Why use an interventional design with three groups? My study used a training experiment to carry out the intervention because the randomization allowed for factors to be distributed equally amongst the groups (Torgerson & Torgerson, 2001). The randomization minimizes variation in outcome measures by allowing the groups to be as homogenous as possible. The randomization thereby contributes to the internal validity of the study and ensures that the only difference between the groups is the intervention itself, which is required in order to adequately respond to the study's research questions. Thus, I intended for the children to be randomized into two groups, the guided play intervention (experimental group) and the art activities group (active control group), using the class lists. In order to control for possible confounding factors, the children in the art activities group attended the same schools as those in the guided play intervention group. A third passive control group was also included in the study because it helps to understand the effectiveness of the intervention compared to the typical classroom instruction (Bowyer-Crane et al., 2008; Han, Moore, Vukelich, & Buell, 2010).

Although the use of a training experimental design is beneficial, according to Torgerson and Torgerson (2001), the format of a tightly controlled experiment may result in the study having low external validity because the results may not be applicable to the wider population. Nevertheless, an experiment aids in reducing the bias in the study that could arise from unmeasured confounding factors, and provides a means of examining the relationship that exists between guided play with elements of pretense and children's self-regulation, language and pre-literacy skills, which is not broadly examined in the literature (Harrington, Cartwright-Hatton, & Stein, 2002). Furthermore, in order to have sufficient power for a medium effect size, I aimed to include a total sample size of 160 children. This sample size is a particular strength of my study as previous studies in the area of pretend play and children's cognitive development have comprised smaller samples and thus were limited by the data analysis that could be conducted to detect the effect of a given test at the desired level of significance.

The study by Arvola, Lastikka and Reunamo (2017) provides further rationale as to why I chose a guided approach to pretend play over other types of play when conducting research with children who have EAL. Arvola, Lastikka and Reunamo explore the type of daily activities that children partake in during the early education context that have positive effects on children's participation. The sample included children from immigrant families who attended daycare centers and preschools in Finland ($N = 316$). Arvola, Lastikka and Reunamo conducted 7,905 observations of the general activity, the children's activity, the object of children's attention, and children's physical activity, involvement and their emotional behaviour and social activity. The results of the study demonstrated the importance of engaging in roleplay activities, which is a component of pretend play, in bridging the cultural divide for children with EAL. This finding was especially true as roleplay was positively correlated with children's participatory action. Arvola, Lastikka and Reunamo emphasize that roleplaying allows children to socialize with each other even though it may not be easy to communicate as it allows children to maintain their cultural group identities while creating a common culture together.

2.6.2 Research questions and hypotheses. Given the benefits of pretend play on children's self-regulation, language and pre-literacy skills as outlined by Elias and Berk (2002) and Rowe (1998), and the cultural influences on play perspectives (Cote & Bornstein, 2009; Fraser, 2007; Frewen et al., 2015; Riley et al., 2004; Singer et al., 2009; Yahya & Wood, 2016), it justifies conducting further research in this area. Accordingly, my study aimed to answer the five research questions which are as follows:

1. ***What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?***
    - What are children's self-regulation, language, and pre-literacy skills at baseline?
    - Are age, EAL status, and gender associated with children's self-regulation, language, and pre-literacy skills at baseline?

There has been a lack of studies in this area that have included children between the ages of four and five, and those from low-income households (Lillard et al., 2013). This study aimed to address the gap in the literature and more so examine the relationship between children's self-regulation, language, and pre-literacy skills in tandem. Additionally, given that previous studies have identified the influence of age, EAL status, and gender on children's self-regulation, language, and pre-literacy skills (Bohlmann et al., 2015; Bunney et al., 2016; Diamond, 2013; Matthews et al., 2009; Matthews et al., 2014; McClelland et al., 2007), I

aimed to see if this would be the case for my sample as well. In terms of the hypothesis, I expected a bidirectional relationship between children's expressive vocabulary and self-regulation skills. Additionally, I expected girls, and native English speakers to have higher expressive vocabulary skills than boys and children with EAL. I also hypothesized that older children would have higher self-regulation, language, and pre-literacy skills than their peers at baseline.

2. ***What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?***
    - Do the results differ amongst the experimental group, active control group, and passive control group?

The basis for the second research question arises from previous studies that emphasize that pretend play allows for the development of various aspects of children's language skills including verbal, vocabulary, and language comprehension skills (Pyle et al., 2018; Weisberg et al. 2013b). Moreover, pretend play permits the development of children's self-regulation skills because when children participate in pretend play activities, they learn and believe the rules that are associated with the pretense scenario that they have created either individually or in collaboration with their peers (Colliver & Fleer, 2016). Furthermore, the need for using an interventional design involving pretend play is crucial as there is a gap in the literature in this area, particularly those studies that are methodologically rigorous, have a large sample size that is culturally diverse, and those that focus on children's self-regulation, language, and pre-literacy skills in tandem (Cheng & Johnson, 2010; Lillard et al., 2013). Lastly, children experience rapid development of their self-regulation and language skills between the ages of four and six, which highlights the need for further research in this area (Bunney et al., 2016; Dockrell & Marshall, 2015; Lillard et al., 2013).

I used scaffolding strategies in the guided play intervention to allow the children to focus on the aspects of the intervention that is within their capability. The concept of scaffolding links to aspects of Vygotskian theory as scaffolding includes interaction between a child and more knowledgeable others at a social level, which is later internalized by the child (Haider & Yasmin, 2015). Scaffolding does necessarily have to include adults as the 'knowledgeable other' but as Vygotsky emphasized, this process can also be facilitated by a more knowledgeable peer (Gottfried, Garcia, & Kim, 2019). Peer tutoring is an effective learning strategy as it increases the children's interest and motivation and improves their attitude and academic skill (et al., 2015). The relationship between peers and children allows

for children to improve their personal exploration. Play particularly facilitates an environment of effective peer tutoring as the children can develop their self-regulation and language skills without being subjected to the pressure of a structured learning environment (Elias & Berk, 2002; Rowe, 1998). As a result, I hypothesized that the inclusion of self-regulation, language and pre-literacy skills as delivered in the format of a pretend play with a guided approach was hypothesized to relieve the pressure of the learning environment and allow for development in these areas. Furthermore, I hypothesized that the explicit phonological awareness and vocabulary instruction component of the guided play intervention would allow for the advancement of children's outcomes in these areas. This was based on the study by Bowyer-Crane et al. (2008) which highlighted that children who appear at risk of experiencing continued reading difficulties would benefit from explicit instruction.

3. ***What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?***
    - Do the correlations differ depending on the area of children's development – self-regulation, phonological awareness, and expressive vocabulary?

There is a gap in the literature regarding the correlation of teacher reports and direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. Given that my study included the participation of both children and their teachers, it provided an opportunity to address this research gap. Law et al. (2017) add that results from standardized direct measures of children's language skills tend to provide different findings from practitioner reports regarding educational need which highlight the need for further research in this area.

4. ***What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?***
    - Are children's exposure to pretend play activities in parent-child interactions similar to their opportunities to engage in other types of play such as object or physical play?
    - Are children's engagement in pretend play activities influenced by gender or cultural background?

The rationale for the fourth research question stems from studies such as that by Yahya and Wood (2016), which emphasize that play bridges the gap between the home and school environment and can be a source of better comprehending the difference in culture between

the two locations. In order for this bridging to occur, information is required about children's exposure to play activities within the home environment. Moreover, I specifically included children with EAL in my study so as to examine the cultural capital in both environments and identify the different perceptions about play and learning that are held by diverse samples. Finally, Cote and Bornstein (2009) demonstrated that gender was a factor that influenced parents' beliefs about children's engagement in play activities. Cote and Bornstein found that boys engaged in fewer pretend play and more exploratory play activities than girls. However, there were no significant effects in terms of the cultural background or interactions involving the cultural background of the children. In terms of the hypothesis, children with EAL were hypothesized to have fewer opportunities to engage in pretend play in comparison to other types of play. It was also hypothesized that girls would have more opportunities to engage in pretend play activities than boys.

5. ***What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?***
    - What are parents' perceptions about the concept of pretend play?
    - Is there a relation between the type of play activity and parents' perception about its relation to the development of children's self-regulation, language, and pre-literacy skills?
    - Is there a relation between parents' perceptions about pretend play and the nature of children's exposure to play activities?

The justification for the fifth research question was supported by Yahya (2015) who highlighted that mothers recognize that play-based learning allows for a pleasurable experience but they did not recognize how it would enhance children's learning in the short- and long-term. Mothers also stated that they were unaware of how to support their children when they engaged in play-based learning. With regards to pretend play in particular, Singer et al. (2009) demonstrated that engagement in pretend play activities is a rare opportunity afforded to children with the exception of those who hail from Ireland, the UK, and the USA. This finding was largely due to the varying opinions of mothers about the value of play. In terms of the hypothesis, parents with EAL were hypothesized to have a low perception of the relation between pretend play and children's self-regulation, language, and pre-literacy skills. Table 3 refers to all of the study's research questions and what aspect of the study they relate to.

Table 3

Research Questions in relation to the Study's Aims

Research Question	Aims
1. What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?	Examine children's self-regulation, language, and pre-literacy skills at baseline which is rarely been explored for this sample
2. What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?	Examine whether the results differ amongst the experimental group, active control group, and passive control group
3. What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?	Bridge the gap in the literature between teacher reports and direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills
4. What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?	Examine children's exposure to play activities within the home environment
5. What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?	Examine parental attitudes towards pretend play as they correspond to different areas of children's development

The study can be viewed as having two arms that allow for the examination of the direct measures of children's skills at baseline and following the administration of the intervention, and parents' attitudes towards the relationship between pretend play and children's learning. The incorporation of both aspects is key because both areas with the EAL sample are under researched. Furthermore Cote and Bornstein (2005) conducted a study that examined the benefit of integrated early childhood services on children's development in the early years and suggested that programs that are run at the school level and include the participation of parents may further aid to reduce the perceived gap between parents and school by allowing for increased opportunities for engagement. Patel, Corter, Pelletier, and Bertrand (2016) also emphasize the importance of including fathers in addition to mothers in the study's design as over recent years fathers have increasingly taken on the greater role as their child's caregiver.

The next chapter will describe the study's methodological framework in detail including addressing the study's design, ethical considerations, sample size, and measures.

Chapter Three

Methodological Framework

This chapter describes the study's aims and research questions and provides details about the background of the study that influenced the particularities of the project. The upcoming sections will also describe the study's design, ethical considerations, sample size, and measures.

3.1 Aims and Research Questions

The study sought to explore the efficacy of a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL. Other studies have demonstrated the link between these skills but as far as I am aware, there has not been an interventional study that has examined children's self-regulation, language, and pre-literacy skills in tandem (Whitebread et al., 2009). For the purposes of the study, self-regulation is examined in terms of behavioral regulation but more so inhibitory control because it has been shown to have an effect on children's academic efficacy (Whitebread et al., 2009). In terms of language, the study particularly focuses on children's phonological awareness and expressive vocabulary skills. These skills were chosen as they were beneficial in other studies and have an influence on children's long-term language development (Collins, 2010; Pullen & Justice, 2003; Ziolkowski & Goldstein, 2008). In terms of pre-literacy skills, the term refers to early literacy skills that provide children with the tools to learn to read and write at a later stage (Roskos and Christie, 2011).

Lillard et al. (2013) illustrate that there are three models that theorize about the relationship between pretend play and positive developmental outcomes in children: (1) pretend play is crucial for the optimal development of children (causal theory); (2) pretend play aids in development but only through one route (equifinality); and (3) pretend play is a by-product of the capability of some other aspect (epiphenomenon). Weisberg et al. (2013b) critiqued Lillard and colleagues' three models for its lack of consideration of the broad definition of pretend play in the literature, and the unlikelihood of controlling for all possible explanatory factors that may influence the relationship between variables. Weisberg and colleagues suggest straying away from closed research questions that inquire about the relationship between pretend play and children's positive developmental outcomes and placing a greater emphasis on the mechanism by which this relationship is fostered. Based on the commentary by Weisberg and colleagues and on previous research in the area of pretend

play and children's self-regulation, language and pre-literacy skills, my study aimed to answer the following research questions:

1. ***What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?***
    - What are children's self-regulation, language, and pre-literacy skills at baseline?
    - Are age, EAL status, and gender associated with children's self-regulation, language, and pre-literacy skills at baseline?
2. ***What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?***
    - Do the results differ amongst the experimental group, active control group, and passive control group?
3. ***What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?***
    - Do the correlations differ depending on the area of children's development – self-regulation, phonological awareness, and expressive vocabulary?
4. ***What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?***
    - Are children's exposure to pretend play activities in parent-child interactions similar to their opportunities to engage in other types of play such as object or physical play?
    - Are children's engagement in pretend play activities influenced by gender or cultural background?
5. ***What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?***
    - What are parents' perceptions about the concept of pretend play?
    - Is there a relation between the type of play activity and parents' perception about its relation to the development of children's self-regulation, language, and pre-literacy skills?
    - Is there a relation between parents' perceptions about pretend play and the nature of children's exposure to play activities?

In terms of the specification of the inclusion of families whose children have EAL, Pumariega and Rothe (2010) emphasize that these children are subject to multiple

simultaneous stressors including learning a new language and navigating the school system. Research also suggests that people from non-Anglo backgrounds may not have had prior exposure to pretend play opportunities (Lillard et al., 2013).

3.2 Participant Characteristics

Since the play abilities of children correspond to their developmental stage (Kelly-Vance & Ryalls, 2008), the sole inclusion of preschoolers between the ages of 4- and 5-years-old in the sample ensured that the play abilities of the children were similar. For the purposes of this study, EAL is defined using the definition specified in the final review of the Reading review produced by the Department for Education and Skills (2006), which states that EAL refers to people who speak another language and are learning English in addition to their home language.

3.3 Ethical Considerations and Desired Sample Size

The study received ethics clearance that is aligned with the guidelines of the University of Cambridge Faculty of Education (Appendix A). The desired results of the study were to see improvement regardless of the child's initial level of self-regulation, language and pre-literacy skills. An a priori power analysis was conducted using G*Power to ensure that an adequate sample size would be recruited, while also taking into account possible attrition over the course of the study. In order to run an ANOVA: fixed effects, main effects and interactions with three groups, two measurements with $\alpha = 0.05$, power = 0.80, and with effect size = 0.30, the total sample size required was 149 children. However, in order to account for attrition, especially given the possible movement for the disadvantaged sample, I aimed to recruit a total sample size of 160 children.

I followed the ethical guidelines commonly used in the field of developmental psychology. A single point in time opt-out consent form was sent to the families of the children prior to the start of the study and families were provided with an option to withdraw their children from the study at any time without giving a reason. More so their children themselves could withdraw from the study at any time without giving a reason. Additionally, prior to the start of the study the families received an information pamphlet that outlined what the project involved, the duration of the study, and how the data would be used and stored. The consent form was only circulated once as I stuck to all of the details outlined in the information pamphlet. Furthermore, the schools had to consent to participate in the study and all the teachers completed a consent form.

All of the information provided to the schools contained my contact details, and parents and teachers could get in touch with me and at point in time if they had any questions or concerns. Furthermore, I was physically present at the schools and the parents were also provided with ample opportunities to approach me in person during drop-off and pick-up times with any questions or concerns that they had. I had a few conversations with parents who were interested in my research background and how I came about focusing on the development of children's executive function and language skills. I was aware of the ethics of developing relationships with young children as the strength of the relationship can influence the progress and the outcomes of the study (Flewitt, 2005). I spent about a week in each of the classrooms prior to the start of data collection which allowed the children to become acquainted with me and ask any questions they might have had. The children were also given an opportunity to share their views throughout the course of the intervention. In terms of the ethics of entering and leaving the site, I stuck to the timeline and protocol outlined in the information pamphlet. I spent a lot of time with the children over the duration of the study and kept a journal, which informed my thinking of the project. However, my time spent with the children did not change the way I analyzed the data as the plan for data analysis was already set out at my first-year upgrade viva.

The children were assessed at two points, pre- and post-intervention. The ethics of repeated testing of young children in light of consent and understanding was considered at each time point. The children were assessed in two 20-minute sessions so as to comply with the attentional capacity of the four- and five-year-olds and to ensure that the children did not feel overwhelmed. In compliance with the ethical practices in the field of developmental psychology, the children were treated with the utmost respect, honesty, and integrity (Schenk & Williamson, 2005). The children were told that they would do some activities and I would take some notes. I would respond to all the questions that the children posed and if they chose not to participate in the activity (i.e. they were tired, did not feel like doing it, or did not like the activity), I respected their decision and the children were not assessed. The children were provided with numerous opportunities to express their views and they were respected.

Additionally, all of the measures that were used to assess the children were designed by experts in the field of developmental psychology and met the needs of the sample, considering their age and culture. The children received a party bag to thank them for participating in the activities, the party bag was also incorporated in the Gift Delay Task. The children who chose not to participate in the study were also provided with the party bag without being assessed to ensure that they did not feel excluded from their peers, especially

considering their young age. I also asked all the parents who opted to withdraw their children from the study if I could give their children the party bag so they would not feel left out, and all of the parents agreed. The assessment of the children at two time points was integral as the information that I gathered about the development of children's executive function and language skills both at baseline and over the duration of the intervention can inform the use of educational interventions in schools and can provide educators and families with a better idea of children's skills at a young age.

I was cognizant of the ethics of power relationships and consequently reflected and adopted rigorous methodological processes (Pascal & Bertram, 2012). The design of the study was shared with the teachers prior to the start of the study and they were provided with opportunities to ask questions and their views were respected. The information pamphlet and questionnaire that were circulated to parents were presented in simple and clear language, and I provided clarifications when parents had any questions. The children were assigned to the three groups – guided play, art activities, and typical curriculum- on the principle of equipoise as there was a lack of interventional research on guided pretend play and children's executive function and language skills. There was no post-study intervention with the active control group (art activities) and the passive control group (typical curriculum) as all components of the intervention – storybook reading, roleplaying and review – were already part of the reception curriculum, they were just not packaged together in the form of an intervention.

3.4 Background of the Study Design

The design of the study was largely influenced by the studies conducted by Bowyer-Crane et al. (2008) and Han et al. (2010). First the study by Bowyer-Crane and colleagues sought to examine the effect of two intervention programs, Phonology Awareness and Reading and the Oral Language programs, on children's reading development. The sample (N = 152) included children whose M_{age} = 4.75 years. Both interventions were conducted over two 10-week periods and shared the same structure- 20-minute one-to-one sessions and 30-minute group sessions that were alternated daily. Each of the two 10-week periods began with an introduction week, followed by three teaching blocks spanning three weeks, which consisted of a two-week introduction period, and a consolidation week. In the case of the Phonology Awareness and Reading program, the children received explicit instruction in phoneme awareness for five minutes through the use of blending and segmenting exercises. These exercises were delivered using multi-sensory techniques that took into account the scaffolding approach, which was catered to the appropriate level of the child. Conversely in

the case of the Oral Language program, the children received explicit instruction in expressive language, inferencing, listening, and vocabulary skills. The study suggested that both programs allowed for the development of children's reading skills; however, it was suggested that an integrated approach combining facets of both the Phonology Awareness and Reading and the Oral Language programs might benefit children who appear at risk of experiencing continued reading difficulties.

The study by Han et al. (2010) utilized a similar design to that of Bowyer-Crane et al. (2008) but also included a play component. Specifically, the study by Han and colleagues aimed to examine if there were differences in the expressive and receptive vocabularies of children that received Explicit Instructional Vocabulary Protocol during storybook reading and children that received shortened Explicit Instructional Vocabulary Protocol and a Play Intervention during storybook reading. The study's sample ($N = 49$) consisted of 4- and 5-year-olds, and one adult delivered the intervention to pairs of children for 30 minutes, twice a week over a four-month period. In the case of the shortened Explicit Instructional Vocabulary Protocol and a Play intervention, the story was read to the children in 20 minutes, and 10 minutes were allotted for the children to engage in pretend play activities. The results of the study indicated that both groups made significant improvements in their expressive vocabulary skills, but the gains for the shortened Explicit Instructional Vocabulary Protocol and the Play Intervention group were higher than that of the Explicit Instructional Vocabulary Protocol group. There were no significant improvements noted in the receptive vocabulary scores for both groups.

Given the results of the studies by Bowyer-Crane et al. (2008) and Han et al. (2010), and considering my sample comprised of 4- and 5-year-olds with EAL whose profile according to Carroll and Chesher (2011) is similar to that of poor comprehendors, I decided to use an integrated approach that included explicit instruction of phonological awareness and vocabulary. Roskos and Christie (2011) adds that studies that have examined the effects of play on children's early-literacy skills such as phonological awareness are limited. Additionally, owing to the link between pretend play and children's self-regulation, language and pre-literacy skills as noted in the literature, all three aspects were incorporated into the design of the study as well. The next section will outline the rationale for the design of the intervention including the explicit phonological awareness and vocabulary instruction, which was a key component of the intervention.

3.5 Rationale for the Design of the Intervention

The design of the guided play intervention with elements of pretense is based on shared storybook reading, and subsequent role-playing. This approach has been utilized in similar studies to improve children's language and pre-literacy skills (Pentimonti & Justice, 2010). Studies have suggested that reading in the company of an adult provides children with opportunities to reflect upon aspects of the texts including the use of language and conventions. Reading with an adult can also serve as an important reading lesson that allows for the development of early-literacy skills (Whitehead, 1999). According to Pentimonti and Justice, engaging in role-playing activities following shared story reading further provides children with opportunities to develop their self-regulation, language and pre-literacy skills, as they are able to reinforce their understanding of the concepts by applying their learning to different contexts. Furthermore, the inclusion of the role-playing component in each session allows children to negotiate their differences and desires, thereby promoting the development of their self-regulation skills (Savina, 2014).

During the storybook reading component, I provided phonological awareness and vocabulary instruction for six target words. First Ziolkowski and Goldstein (2008) define phonological awareness as sensitivity to the units of sound in oral language such as the words contained in sentences, the syllables contained in words, and the beginning and end sections of words. For the purposes of the study, the children received explicit instruction in two areas of phonological awareness- rhyme and initial sound off. These two areas were chosen as they were beneficial for children's language and pre-literacy skills in the study by Ziolkowski and Goldstein. In addition, the National Reading Panel (2000) notes that the effect sizes were larger when children received explicit phonological awareness instruction in one or two areas as opposed to when they were instructed in three or more areas of phonological awareness. Pullen and Justice (2003) also state that preschoolers benefit from the examination of phonological awareness skills on shallow tasks that pay particular attention to sensitivity of large phonological aspects including words and syllables.

The particular emphasis on phonological awareness in my study is supported by Pullen and Justice (2003). Pullen and Justice state that phonological awareness provides the basis of word-level reading skills and that along with other wider language skills, they are critical to the foundation of children's reading comprehension skills. Although the children received explicit phonological awareness instruction, Pullen and Justice argue that the format of the delivery of the information need not be drill-like. Presenting the information in an engaging and enjoyable manner such as through the use of pretend play with a guided

approach may allow children to better comprehend the structure of language, but the National Reading Panel (2000) cite that more research is required in this area.

In addition to phonological awareness, the children also received explicit vocabulary instruction because as suggested by Collins (2010), it is one of the strongest predictors of children's educational success. Additionally, children develop their vocabulary at an extremely rapid rate during the pre-school years. Vocabulary instruction is particularly important when working with children from diverse backgrounds and from low-income households. McLeod et al. (2017) noted that disadvantaged children who begin primary school with vocabulary skills lower than that of their peers are likely at risk for reading problems. Children who come from low-income households are particularly at risk for experiencing language and reading delays due to parental education, income and involvement. Consequently, interventions are vital to enhance the vocabulary skills of disadvantaged children so as to reduce the deficits in preschool and in kindergarten. The manner of vocabulary instruction in my study was similar to that included in the studies by Collins and Coyne et al. (2004) that consisted of providing the children with a simple, general definition for each of the words, and presenting a synonym that is used within the context of the story. This method of vocabulary instruction was chosen because as suggested by Han et al. (2010), effective vocabulary instruction for young children should increase the frequency by which words are encountered through storybook reading and other activities either prior or following the reading. Hence, I provided both explicit and direct meanings of the target words, used a reading style that is interactive, and increased the context by which the children were provided with exposure to new words.

3.6 The Intervention involves Shared Storybook Reading, Roleplaying, and Review

This study utilized a training experiment to examine the efficacy of a guided play intervention with elements of pretense on the self-regulation, language and pre-literacy skills of children with EAL. Specifically, the children were randomized into two groups, experimental group – guided play intervention and active control group – art activities. A third passive control group was also included in the study that were exposed to the typical curriculum. Thus, the results of the guided play intervention in terms of children's self-regulation, language and pre-literacy skills were then assessed against the children that were in both the art activities group and the passive control group.

The intervention was designed to consist of sixteen 30-minute sessions over a duration of 13 to 15 weeks, in groups of five to six children. The children received exposure to four

books over the course of the 16 sessions. Each book was read four times to the children as Coyne et al. (2004) have shown that this repetition allows for an effective method of developing children's language skills. The children in the art activities group also received a total of sixteen 30-minute sessions over 13 to 16 weeks, set up in a similar timeframe as for children in the guided play intervention group. Instead of engaging in role-playing activities following story reading, children in the arts activities group participated in art activities unrelated to the book. The children were randomly allocated to either the experimental or the active control group using the list of children within each classroom as was done in the study by Barnett et al. (2008).

Each session of the guided play intervention consisted of three components: (1) shared storybook reading; (2) roleplaying; and (3) review (Biemiller & Boote, 2006; Collins, 2010; Wasik & Bond, 2001; Ziolkowski & Goldstein, 2008). The shared storybook-reading component lasted 10 minutes, during which I identified six target words that included both nouns and adjectives, which were critical to the comprehension of the story and were unlikely familiar to the preschoolers (Carroll & Snowling, 2004). The children were also given the opportunity to have multiple exposures to the target words in both the role-playing and the review component of each session because according to Biemiller and Boote, and Wasik and Bond, repeated exposure is beneficial for the development of their language and pre-literacy skills. Although the children were exposed to one book over four sessions, the shared storybook reading component of the first session for each storybook did not include explicit phonological awareness and vocabulary instruction for the target words because Biemiller and Boote claim that it allows the children to become familiar with the contents of the book in its entirety.

The second component of each guided play session included providing children with an opportunity to role-play. During this 10-minute period, the children were provided with props that were related to the storybook in the first component. I began by naming the props, and the children's subsequent interaction with the physical objects provided them with concrete representations of the words (Wasik & Bond, 2001). The children could also engage with the objects in different contexts that have been shown to have a positive effect on their language and literacy skills.

The third and final component of the guided play intervention was the review of the session (Schunk, 1999). During this 10-minute period I reviewed the phonological awareness and the vocabulary for the target words by asking the children open-ended questions (Pullen

& Justice, 2003). I also provided corrective feedback to further develop the children's learning (Carroll & Snowling, 2004). Refer to Table 4 for a summary of the guided play intervention for the four sessions with each storybook.

Table 4

Components of the Guided Play Intervention for the Four Sessions with each Storybook

	Guided play group	
Time	Session 1	Sessions 2-4
First 10 min	• I read a storybook with a fantastical theme to the children	• I re-read the storybook from Session 1 to the children • While reading the story I pinpointed six target words, that were different for each session, and provided explicit phonological awareness and vocabulary instruction
Next 10 min	• I introduced and named props that were related to the story, and the children had the opportunity to engage in role-playing activities • I scaffolded the activity and provide positive reinforcement to the children	• The same props were provided as in Session 1, and the children could engage in role-playing activities • Once again, I scaffolded the activity and provided positive reinforcement to the children
Last 10 min	• I reviewed the activity with the children using open-ended questions	• I reviewed the activity with the children including the phonological awareness and vocabulary of the target words using open-ended questions

The children in the active control group (art activities) were exposed to a similar structure as those in the guided play intervention group but instead of participating in the role-playing components following the shared storybook reading section, the children were given 10 minutes to engage in art activities that were unrelated to the story. This 10-minute art activities period was followed by the 10-minute review component that was similar in structure to what the children in the guided play group experienced. The children in the passive control group continued with the typical school curriculum without interruption.

In order to provide a thorough description of the intervention, I will outline an example of what a typical session for the guided play group and the art activities group entailed. In the case of both the guided play and the art activities groups, the children, in groups of five or six, accompanied me to another room in the school where I would spend 10

minutes reading them a storybook with a fantastical theme and providing explicit phonological awareness (initial sound and rhyme) and vocabulary instruction for six words. Since the children were read the same book four times, they often would attempt to tell me how the story would develop and often commented on how the pictures complemented the story. I would not dissuade them from asking questions but was also mindful that we stuck to the 10 minutes allotted for the storybook reading component of the intervention.

Following the storybook reading component, I provided the children in the guided play group with props related to the story and they were able to engage in roleplay activities of their choosing. Typically, the children would break out into two or three smaller groups and sometimes a child would choose to play by themselves. In most cases for the four sessions with each book, the child continued to elaborate on the same play narrative that they had developed from the first play session with the book. I would use scaffolding strategies where appropriate to further the children's learning opportunities. Conversely, children in the art activities group were provided with art and craft supplies and they had 10 minutes to create whatever they liked. The children would all sit around a large table and work on art of their choosing often discussing what they were making, the hobbies they liked to engage in or what their families were like. I did not interfere with the children's art activities unless the children had a dispute about the sharing of the art supplies.

The last 10 minutes of the session consisted of reviewing what the children had done during the guided play or art activities component depending on the group they were randomized to. Each child was provided with an opportunity to describe what they had done, and I would inquire about how and why they came up with a certain play narrative or settled on creating a specific piece of art. On occasion, a child would say that they did not feel like describing what they had done with the group and I noted that it was alright. For sessions 2-4 with each book, I would also go over the six words that I had provided explicit phonological awareness and vocabulary instruction for during the storybook reading component. I would ask the children to provide me with the initial sound of the word, what it rhymed with, and what the word meant. The children received positive reinforcement and corrective feedback on the responses they provided. Upon the conclusion of the review component, I would walk the group of children back to their classroom. The children were away from their classroom for a maximum of 40 minutes when taking the walking time and the time it took to get the children to settle down in the intervention room into consideration.

3.7 Principles of Intervention Research

Intervention research involves the process of developing new strategies or enhancing existing strategies for the purpose of altering a behaviour, improving outcomes or reducing risks (Fraser, Richman, Galinsky, & Day, 2009). The intended outcomes of interventions are frequently nested in a hierarchy, and hence may result in group-level or individual-level outcomes depending on the target of the intervention. Consequently, interventions can be focused and consist of one action, or consist of a cluster of actions. Even in the case of a single action intervention, a complex set of sub-strategies might be required in its implementation. Nevertheless, it is critical that the reliability and validity are considered in the design of the intervention.

The term reliability is used to refer to the consistency of the experimental effect, whereas validity is concerned with the accuracy of the experiment and the degree to which the intervention explains what it claims to explain (Breakwell, Hammond, & Fife-Schaw, 2006). The concept of validity is further subdivided into internal validity and external validity (Bryman, 2008). With regards to internal validity, it typically concerns the issue of causality and the degree of confidence that the intervention is responsible for the variation noted in the outcome measures. External validity on the other hand relates to the generalizability of the results beyond the specific context in which the research was conducted. The impact of the intervention is measured by its effect size but the implementation of an extremely effective program is difficult, and is likely to have low impact and generalizability (Fraser et al., 2009).

In addition to the issues of reliability and validity, efficacy and effectiveness are other key aspects that should be duly considered in intervention research. Efficacy studies are often conducted in settings that are highly controlled so as to eliminate alternative explanations and to conclude to a certain degree of confidence that the observable outcomes are a result of the intervention (Fraser et al., 2009). Moreover, randomization is frequently utilized, and the participants are allocated to either the intervention (treatment group) or the alternate group (control group). Consequently, the researcher, who is commonly the program developer, is extremely involved in all aspects of the efficacy trial particularly with regards to the delivery of the intervention. Conversely, effectiveness trials are typically conducted under real-world conditions, and the researcher has limited control over implementation factors that might contribute to the observable outcomes. A key aspect of an effectiveness trial is that the intervention is delivered at many study sites, and the researchers at each site monitor how the intervention is delivered as replication of findings is of critical importance without the

involvement of the program developer. Nevertheless, it is imperative that both efficacy and effectiveness trials are carried out for an intervention to be referred to as evidence based.

In addition to efficacy and effectiveness, fidelity and adaptation also need to be considered when doing intervention research. Fidelity is concerned with the extent by which the delivery of an intervention adheres to the specified protocol, which is commonly known as program integrity. Adaptation on the other hand refers to modifications that are made to the intervention when it is used amongst a new population to best suit the needs and demographic of the clientele. Thus, it may appear that fidelity and adaptation are located on opposite ends of the spectrum but as described by Fraser et al. (2009), "it is precisely at the intersection of fidelity and adaptation that many new interventions are created" (p. 17).

In terms of the design of the study, intervention research can involve different methods that are carried out rigorously, and can consequently utilize both the quantitative and qualitative approach as appropriate (Fraser et al., 2009). Moreover, the process of carrying out intervention research is iterative as the development of an intervention is continuously influenced by new theories, reviews from experts, practical experience, and critical appraisal based on the data collected. This process is aligned with the work of Thomas and Rothman (1994), as they suggest that there are six phases involved when designing an intervention: (1) problem analysis and project planning; (2) information gathering and synthesis; (3) design; (4) early development and pilot testing; (5) evaluation and advanced development; and (6) dissemination.

Although it is important to consider the benefits of interventional research, it is equally imperative to bear the challenges in mind as well. First, since intervention research often involves causal inferences, when the mediators of the outcomes are determined, it can inform theory (Fraser et al., 2009). However, this progression is often achieved through a series of studies as opposed to a single study. Additionally, given the increased involvement of the researcher in intervention research, especially when conducting efficacy trails, this lack of independence can act as a source of bias and could result in a potential conflict of interest. Thus, intellectual honesty and scientific rigor are essential to conducting intervention research.

The principles in intervention research are reflected in the design of my study. My study seeks to examine the efficacy of a guided play intervention with elements of pretense and is intended to improve the self-regulation, language and pre-literacy skills of 4- to 5-year-olds with EAL. The intervention is place-based as it was carried out in reception classes in

schools and included three groups: (1) guided play group (experimental group); (2) art activities group (active control group); and (3) typical curriculum (passive control group). Although a focused intervention is utilized in the study, the process of implementation is complex, and the issues of reliability, validity, fidelity and adaptation are considered. All the measures that were used in the study are highly reliable and valid. In terms of fidelity and adaptation, the design of the intervention has been modified from that used in previous studies to be age and culturally appropriate. Finally, since I was highly involved in all aspects of the research, every attempt was made to ensure that the rigor and trustworthiness of the study are maintained. These attempts involved thorough statistical analysis, and I noted the limitations of the study in the final chapter, Chapter Seven.

3.8 Selection of the Books and Words used in the Intervention

Hutchinson, Whiteley, Smith, and Connors (2003) emphasize the importance of utilizing books that are sensitive and familiar to the cultural knowledge of the children. These books ease children's understanding of the text, and in turn allow for the development of language and pre-literacy skills (Hutchinson et al., 2003). Four books (Beck & Mckeown, 2007) were utilized in the current study based on the recommendations of other researchers that have worked with families with EAL. Additionally, all four books had fantastical themes because in the study by Skolnick et al. (2015) that aimed to examine if books with realistic or fantastical themes allow for children's optimal vocabulary development. The results demonstrated that children who were exposed to shared reading of stories with fantastical themes in small groups followed by play activities experienced significantly greater gains in their vocabulary learning over children who were exposed to shared reading of stories with realistic themes. Skolnick and colleagues suggest that stories with fantastical themes may allow for greater cognitive processing of the elements than stories with realistic themes because the content is not aligned with the laws of reality.

Additionally, although there has been debate in recent studies concerning children's ability to differentiate between fantastical and real events portrayed in children's television shows, this debate does not extend to children's books (Li, Boguszewski, & Lillard, 2015). The studies by Shtulman and Carey (2016), Woolley and Van Reet (2016), and Woolley and Cox (2007) demonstrate that children can differentiate between fantastical and real events when presented through the format of storybooks. With the help of librarians that specialized in children's literature, I narrowed down the list of books to be used in the study to five. However, this number exceeded the four books that were required for the study, so I asked mothers for their opinions about the books during the first pilot I carried out. These results

will be presented in the following chapter. Refer to Appendix B, which notes the list of other books that were initially considered for use in the study but were excluded upon further consideration.

In terms of the words that were used in the intervention, the children received explicit phonological awareness and vocabulary instruction for 18 words in each of the four books, six words per session for Sessions two to four for each of the books. I conceived that all of the words would be Tier One words that (Beck, McKeown, & Kucan, 2013) define as words at the most basic level and seldom require instruction in schools but given the children's EAL status, it would be inappropriate to teach the children more challenging words when they do not necessarily have a firm foundation to begin with (Han et al., 2010). Since the explicit instruction of phonological awareness included initial sound, I prioritized that aspect and tried to ensure that the six words per session had different initial sounds.

3.9 Justification for the use of Scaffolding Strategies and Positive Reinforcement

Throughout the intervention, I scaffolded the children's learning. According to Bruner, scaffolding involves an adult monitoring the elements of the activity that are beyond the child's learning capacity at the first instance, thereby allowing the child to focus on the aspects of the task that is within his or her capability (Wood et al., 1976). The concept of scaffolding is aligned with Vygotsky's (1986) concept of the zone of proximal development that states that children would benefit from exposure to activities that are beyond their capabilities as it provides them with opportunities to develop their skills. According to Vygotsky, in order for the scaffolding approach to be effective, the strategy needs to cater to the appropriate level within the child's zone of proximal development. Hence, in my study I implemented differentiated high and low support strategies for scaffolding that corresponded to the needs of the heterogeneous groups of children (Pentimonti & Justice, 2010). As the children developed their skills and became more independent, I gradually withdrew the support provided to the children. This withdrawal is also supported by Han et al. (2010) who recommend that the role of adults in children's play activities should be dynamic as it boosts children's literacy opportunities. Siraj-Blatchford (2009) adds that the sequence of gradual reduction of scaffolding and extension can be used to support children's learning including play-based learning in early childhood.

Six high and low strategies were utilized in the study based on those that were effective in the study conducted by Pentimonti and Justice (2010). The scaffolding strategies included co-participating, reducing choices, eliciting, generalizing, reasoning, and predicting.

I also provided the children with positive reinforcement for participating in higher levels of play, which according to Collins (2010), Schunk and Zimmerman (1997), and Pea (2015) is an effective technique for engaging children in pretend play activities without the use of direct imitation. The repeated use of scaffolding and reinforcement also allows for the development of children's self-regulation skills because the children are able to utilize all their skills independently and adapt them as the contextual and personal conditions change (Schunk, 1999).

I chose to use a guided play approach that involves scaffolding as opposed to a free play approach in my intervention as free play tends to be based on content, ideas, and language that children are already familiar with (Bowman, 2014). The use of scaffolding in the guided play approach provides the children with a chance to develop and further enhance both their content and language knowledge. This development occurs as adults begin by scaffolding the activity initially based on the children's strengths and prior knowledge and using that as a platform to support children learn novel content, ideas, and language. Toub et al. (2018) elaborate that play particularly allows for a medium to scaffold children's development of vocabulary skills by exposing and engaging them with words in a meaningful manner. In a meta-analysis of 164 studies conducted by Alfieri, Brooks, Aldrich, and Tenenbaum (2011), the findings suggested that the use of assisted discovery methods such as guided play best supports children's development of computer skills, mathematics, physical and motor, science, social science, and verbal skills in comparison to the free play or direct instruction approach. Children's learning is enhanced when adults scaffold the activity towards a learning goal, encouraging children to make connections between new information and what they are already aware of, while making the environment meaningful and fun for the children (Samuelsson & Johansson, 2006; Zosh et al., 2018).

3.10 Materials and Procedures for Baseline and Intervention Data

The children's self-regulation, language and pre-literacy skills, engagement with the intervention, and children's play behaviors in the home and parents' perceptions about play were assessed pre- and post-intervention using a number of measures. The children were assessed individually in a quiet room in the school that was unoccupied, and data was not collected if the children did not want to participate in the activities. The parents also asked to provide details of the family's SES pre-intervention, and teacher reports were collected post-intervention. With regards to scoring of the standardized tests, the standardized rules were used. Some of the tasks were scored while the child was present: Heads, Toes, Knees, and Shoulders Task (Diamond et al., 2002; Mcclelland et al., 2014), Statue Task (Korkman et al.,

2007), Gift Delay Task (Kochanska et al., 1996), and the Phonological Awareness and the Expressive Vocabulary subtests of the CELF-P2 (Andersson et al., 2019). The other tasks were scored offline.

3.10.1 Measures of the children's self-regulation skills.

3.10.1.1 The Heads, Toes, Knees, and Shoulders Task. The children's self-regulation skills were assessed using the Heads, Toes, Knees, and Shoulders Task (Diamond et al., 2002; Mcclelland et al., 2014) because it is specifically designed to examine the behavioral regulation component of self-regulation that includes inhibitory control (Cameron et al., 2008). I asked each child to participate in a game such that when he or she is told to touch his or her head, he or she must touch his or her toes instead. A second rule was added that states when he or she is instructed to touch his or her knees, he or she must touch his or her shoulders instead. The children were provided with four practice trials during which the instructions were repeated thrice, and I modelled the actions. Following the practice trails, the children were tested on three parts each with 10 trials in random order and no corrective feedback or modelling was provided. In terms of the scoring, the children received two points for every correct response, one point for a response that was self-corrected, and no points for an incorrect response for a maximum total score of 60 points.

3.10.1.2 The Statue Task. A subtest of the Developmental Neuropsychological Assessment Second Edition (NEPSY-II) (Korkman et al., 2007), the Statue Task was also used to assess the children's self-regulation skills. One of the benefits of using the Statue Task is that a single subtest of the NEPSY-II can be administered (Brooks, Sherman, & Strauss, 2010). The Statue Task is found in the attention and executive function domain of the NEPSY-II and is designed to assess the child's inhibition and motor persistence. It took 75 seconds to administer the test, and the child was required to maintain a body position with eyes closed whilst ignoring the distractions and sounds that I was making. The scoring was conducted for every five-second interval, noting the child's body movements, eye openings, and vocalizations. The child received up to two points for no errors at every five-second interval, for a maximum total score of 30 over the fifteen 5-second intervals. The Statue Task has strong reliability with coefficients of .82 and .88 when administered to 4- and 5-year-olds respectively.

3.10.1.3 The Gift Delay Task. The same approach was used to conduct the Gift Delay Task (Kochanska et al., 1996) as was the case in the 'Think-Art! Study' (Ellefson & Hughes,

2011) to assess the children's self-regulation skills. Two minutes prior to the end of the first testing session, the child was given a gift that was concealed in a bag and he or she was told that it should be taken back to the classroom. The child had the choice of determining where he or she would like to place the gift, such as 'hold in hand', 'on the table where it is visible' or 'behind the sofa where it will not be visible'. Additionally, the child was given a choice as to whether he or she would like to 'receive clues about the gift' or 'talk about something different' prior to entering the classroom. Whether or not the child peeked into the bag was also noted. The child was given a total score from zero to five depending on whether the child was able to resist the temptation to look at the gift. Up to two points were awarded if the children chose to have the bag out of sight (0 = hold in hand; 1 = on the table; 2 = behind the sofa), Up to two points were awarded depending on the distraction method the child chose (1 = hear clues about the gift; 2 = talk about something different), and one point was awarded depending on whether the child peeked into the gift bag (0 = peeked into the bag; 1 = did not peek into the bag).

3.10.2 Measures of the children's language and pre-literacy skills. In order to assess children's phonological awareness, I utilized the Phonological Awareness subtest of the CELF-P2 (Andersson et al., 2019). In terms of assessing the children's expressive vocabulary skills, the Expressive Vocabulary subtest of the CELF-P2 was used (Andersson et al., 2019). Similarly, in connection with assessing the children's pre-literacy skills, the Pre-Literacy Rating Scale of the CELF-P2 was utilized (Andersson et al., 2019). Hence, the following subtests of the CELF-P2 were used in the study: (1) Phonological Awareness; (2) Expressive Vocabulary; and (3) Pre-Literacy Rating Scale. These three subtests were chosen because they have strong internal reliabilities.

3.10.3 Measure of the children's engagement with the intervention. In order to control for children's engagement with either the guided play intervention or the art activities, I aimed to utilize the checklist of 25 behaviors that was used in the 'Think-Art! Study' (Ellefson & Hughes, 2011). The checklist was based on the Bayley Behaviour Rating Scale that identifies the importance of measuring the abilities and behaviors of children in early childhood to determine if they would benefit from early intervention (Thompson, Wasserman, & Matula, 1996). According to Thompson and colleagues, the Bayley Behaviour Rating Scale has good construct validity and the reliability coefficients and composite scores for the subscales ranged from .86 to .93.

3.10.4 Measure of the family's SES and language environment. My study intended

that parents complete a questionnaire which was used in the 'HK-UK Family Thinking Skills Study' to collect demographic information about the families. This questionnaire would collect information regarding the families SES by inquiring about four questions that are included in the Family Affluence Scale II (Boudreau & Poulin, 2009). It is particularly important to examine the role of the family's SES as it has been shown to predict children's cognitive performance (Hughes & Ensor, 2007). The questionnaire also inquired about other possible explanatory variables such as the age of the parents and child, child's gender, family composition, languages spoken at home, parents' level of education and employment status, parents' marital status, ethnicity, frequency of home reading, length of stay in the UK, and prior childcare experience. Based on consultation with one of the researchers in the 'HK-UK Family Thinking Skills Study', some of the options on the questionnaire were modified to allow for more systematic responses. In order to control for the influence of multilingualism and the children's language environment on outcomes and responses to the intervention, the questionnaire also included items from the Alberta Language Environment Questionnaire (Appendix C). The responses for the questionnaire about the family's SES and language environment were not scored in the study as very few responses were received.

3.10.5 Measures of the children's play behaviors in the home and parents' perceptions about play. The 24-item parental questionnaire is adapted from the study by Fisher et al. (2008) and was created by a group of child development experts who were extremely familiar with the literature surrounding play. The 24-item list enquires about three main questions: (1) the frequency of children participation in each activity at home; (2) the degree of playfulness for each activity; and (3) each activity's contribution to the development of children's self-regulation, language, and pre-literacy skills (Appendix C). In the study by Fisher and colleagues, the researchers noted a high internal consistency for each of the three questions with Cronbach's alpha ranging between .91 and .93. Due to copyright restrictions, only the copies of certain measures are included in the appendices. Table 5 summarizes the measures that were to be used in the study. The responses for the parental questionnaire about the children's play behaviors in the home and parents' perceptions about play were not scored in the study as very few responses were received.

3.10.6 Teacher evaluation. I requested the classroom teachers to complete an evaluation of the children's skills over the course of the intervention on a scale from one (much decline) to five (much improvement). The teacher evaluation was adapted from that utilized in the 'HK-UK Family Thinking Skills Study' (Appendix D).

Table 5

Summary of the Measures to be used in the Study

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS Task • Statue Task • Gift Delay Task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive Vocabulary subtest of the CELF-P2
	Assessment of children's engagement during the time period of the intervention	• Checklist from the 'Think-Art! Study'
Parent	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	SES and language environment	• Questionnaire adapted from the 'HK-UK Family Thinking Skills Study'
	Children's play behaviors in the home and parents' perceptions about play	• Parental questionnaire adapted from Fisher et al. (2008)
Teacher	Teacher Evaluation	• Teacher evaluation adapted from the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

The participants in all three groups were assessed at two time points, pre-test prior to the start of the intervention and post-test immediately following the conclusion of the intervention period. Given the young age of the children in the sample and to minimize the effect of participant fatigue on the validity of the study's assessments, the duration of the testing period did not exceed 45 minutes and instead consisted of two 20-minute testing sessions (Biemiller & Boote, 2006). Session A included the Statue Task (Korkman et al., 2007), Phonological Awareness subtest of the CELF-P2 (Andersson et al., 2019), and the Gift Delay Task (Kochanska et al., 1996). Session B consisted of the Head, Toes, Knees and Shoulders Task (Diamond et al., 2002; Mcclelland et al., 2014) and the Expressive Vocabulary subtest of the CELF-P2 (Andersson et al., 2019). Table 6 outlines the measures as they correspond to each of the research questions.

Table 6

Summary of the Measures as they correspond to the Research Questions

Research Question	Measures
1. What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?	Pre-test scores of the following measures: • HTKS Task • Statue Task • Gift Delay Task • Phonological Awareness subtest of the CELF-P2 • Expressive Vocabulary subtest of the CELF-P2 • Pre-Literacy Rating Scale of the CELF-P2 • Questionnaire adapted from that used in the 'HK-UK Family Thinking Skills Study'
2. What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?	• Pre- and post-tests scores of the following measures: o HTKS Task o Statue Task o Gift Delay Task o Phonological Awareness subtest of the CELF-P2 o Expressive Vocabulary subtest of the CELF-P2 o Pre-Literacy Rating Scale of the CELF-P2 • Questionnaire adapted from that used in the 'HK-UK Family Thinking Skills Study' • Checklist from the 'Think-Art! Study'
3. What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?	• Teacher evaluation adapted from that utilized in the 'HK-UK Family Thinking Skills Study' • Difference between the post- and pre-test scores of the following measures: o HTKS Task o Statue Task o Gift Delay Task o Phonological Awareness subtest of the CELF-P2 o Expressive Vocabulary subtest of the CELF-P2
4. What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?	• Pre- and Post-test responses on the Parental questionnaire adapted from that used in the study by Fisher et al. (2008) • Questionnaire adapted from that used in the 'HK-UK Family Thinking Skills Study'
5. What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?	• Pre- and Post-test responses on the Parental questionnaire adapted from that used in the study by Fisher et al. (2008) • Questionnaire adapted from that used in the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

The following chapter will describe in detail the two pilot studies that were conducted prior to the main study and will also expand on the practical constraints that influenced the changes in the measures used in the main study.

Chapter Four

Pilot Study 1 and 2

Two pilot studies were conducted prior to the main study and this chapter will describe the aims, methods, results and discussion of both pilot studies and how their findings influenced the design of the main study. This chapter will also address the practical constraints that influenced the changes in the measures used in the main study.

4.1 Pilot Study 1: Suitability of the Measures and the Storybooks

Pilot study 1 had five aims: (1) to examine the adequacy of the measures carried out; (2) to examine the variability of the tasks; (3) to increase comfortability in administering the measures; (4) to identify potential logistical problems that might arise using the proposed measures; (5) to gauge feedback from the parents about narrowing down the selection of the books that would be used in the main study.

4.1.1 Method.

4.1.1.1 Participants and Materials. The participants were recruited using the database of families that have visited the University of Cambridge Faculty of Education in the past and have participated in prior studies. The participants were also recruited through snowball sampling ($N = 8$). There were five girls and three boys ($M_{age} = 57$ months, $SD_{age} = 4.2$ months) all of whom had English as a first language. Copies of the information pamphlet (Appendix E), opt-in consent form (Appendix F), and the questionnaire were emailed to parents with 4- to 5-year-olds that could have potentially been included in the study's sample.

4.1.1.2 Procedure. Every child came into the Faculty on two occasions with their mothers. Each visit included a 20-minute assessment period followed by a 40-minute session of partaking in art activities. Several measures were used to assess the children's self-regulation and language skills. Three measures were used to measure children's self-regulation skills which included the Heads, Toes, Knees, and Shoulders Task (Diamond et al., 2002), the Statue Task (Korkman et al., 2007), and the Gift Delay Task (Kochanska et al., 1996). Three measures were used to assess children's language and pre-literacy skills- the Phonological Awareness subtest of the CELF-P2, the Expressive Vocabulary subtest of the CELF-P2, and the Pre-Literacy Rating Scale of the CELF-P2 (Andersson et al., 2019). The *questionnaire* adapted from the 'HK-UK Family Thinking Skills Study', and the 24-item *parental questionnaire* adapted from Fisher et al. (2008) were used to gather information

about SES and parents' attitudes towards play and their children's learning. Parents could respond to the questionnaires in hard copy or were also able to complete the questionnaires electronically using the Qualtrics form that I had made available. All of the measures are summarized in Table 7.

Since the child came into the Faculty on two occasions, the order of the sessions was alternated between the participants. In Session A, I assessed the children using the Statue Task (Korkman et al., 2007), the Phonological Awareness subtest of the CELF-P2 (Andersson et al., 2019), and the Gift Delay Task (Kochanska et al., 1996). Session B included the administration of the Head, Toes, Knees and Shoulders Task (Diamond et al., 2002; Mcclelland et al., 2014) and the Expressive Vocabulary subtest of the CELF-P2 (Andersson et al., 2019).

Table 7

Measures used in Pilot Study 1

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS Task • Statue Task • Gift Delay Task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive Vocabulary subtest of the CELF-P2
Parent	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	SES and language environment	• Questionnaire adapted from the 'HK-UK Family Thinking Skills Study'
	Children's play behaviors in the home and parents' perceptions about play	• Parental questionnaire adapted from Fisher et al. (2008)

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

Following the administration of the child measures and while the child was participating in the art activities, I engaged in discussions with the child's mother about the five potential books that were shortlisted for use in the main study: (1) *Winnie the Witch* by Korky Paul and Valerie Thomas; (2) *Traction Man is Here* by Mini Grey; (3) *Again* by Emily Gravett; (4) *The Lonely Beast* by Chris Judge; and (5) *The Pea and the Princess* by Mini Grey.

The five books were especially shortlisted for use with children with EAL as they had universal themes and the characters were not culturally specific. The feedback from the mothers about the selection of storybooks was key as all the participants had English as their first language. Consequently, the mothers were familiar with the books and could provide useful feedback about how the books were received by their children so that when they would be used with children with EAL, they would hopefully find the storybooks enjoyable.

4.1.2 Results and Discussion. In terms of the first fours aims of pilot study 1 – to examine the adequacy of the measures carried out, to examine the variability of the tasks, to increase comfortability in administering the measures, and to identify potential logistical problems that might arise using the proposed measures – the results demonstrated that carrying out the assessments in Sessions A and B took 20 minutes each but the children would benefit from the addition of another 10 minutes, which would allow time for the children to settle down and feel more comfortable. I noted that the children were more at ease and eager to participate in the assessments during the second rather than the first assessment session.

In terms of the specific measures, three out of the eight children that were assessed did not want to complete the Statue Task (Korkman et al., 2007) as they did not like the idea of standing still. Two other children that were included in the sample were also extremely reluctant to complete the Statue Task. Despite the lack of uptake by the participants, I decided to continue to use the Statue Task as it takes a maximum of three minutes to administer, and is shown to be a robust measure in previous studies (Brooks et al., 2010). Table 8 contains the descriptive statistics of the child measures used in pilot study 1. The order of the assessment sessions did not affect the children's scores and consequently, all children in the main study were assessed first with Session A followed by Session B on a different day. Table 9 includes the list of measures in Session A and B.

Table 8

Descriptive Statistics of Scores for Pilot Study 1

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Pre-Test ST	5	5	30	20.20	10.40	-.61 (.91)	-.33 (2.00)
Pre-Test HTKS	7	5	43	22.00	13.24	.63 (.79)	-.51 (1.59)
Pre-Test GD	8	3	4	3.63	.52	-.64 (.75)	-2.24 (1.48)
Pre-Test PA	8	0	17	6.38	5.26	1.02 (.75)	1.93 (1.48)
Pre-Test EV	8	12	34	21.13	6.64	.87 (.75)	1.39 (1.48)

Abbreviations: ST, Statue Task; HTKS, Head, Toes, Knees and Shoulders Task; GD, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 9

List of Measures in the Assessment Sessions

Session	Measures
A	• Statue Task • Phonological Awareness subtest of the CELF-P2 • Gift Delay Task
B	• Head, Toes, Knees and Shoulders Task • Expressive Vocabulary subtest of the CELF-P2

With regards to the Pre-Literacy Rating Scale of the CELF-P2 (Andersson et al., 2019), mothers of two out of the eight children that were examined noted that the classroom teacher might be better able to provide more accurate responses to the Pre-Literacy Rating Scale of the CELF-P2 as some of the questions refer to skills that may not be explicitly practiced in the home environment. For example, two of the eight mothers pointed out that they had severe difficulty providing a response for item four of the Pre-Literacy Rating Scale of the CELF-P2 that enquires about the child's recognition of common logos in the community but that the teacher may be better suited to rate the child. Upon further consideration, I decided that since the Pre-Literacy Rating Scale only takes a couple minutes to complete, I would request that the classroom teacher respond to the rating scale for each child.

In terms of the fifth aim of the pilot study which was to gauge feedback from the parents about narrowing down the selection of the books that would be used in the main

study, Table 10 summarizes the mothers' responses as to whether their children enjoyed the stories. The four books with the greatest frequency were used in the main study which included *Winnie the Witch* by Korky Paul and Valerie Thomas, *Traction Man is Here* by Mini Grey, *Again* by Emily Gravett, and *The Lonely Beast* by Chris Judge. With regards to the ordering of the books for use in the main study, *Winnie the Witch* was used first as it has the simplest storyline that was the most repetitive so it would better facilitate the learning for the 4- and 5-year-olds (Hassinger-Das et al., 2017). Then followed *The Lonely Beast*, *Again*, and *Traction Man* as the degree of fantasy increased respectively within the stories. Lastly, in terms of the suitability of the use of the art activities as an active control group, all of the children enjoyed partaking in the art activities and thus in the main study, the children in the active control group took part in the same activities. Based on the findings of pilot study 1, revisions were made to the study's measures that are summarized in Table 11.

Table 10

Frequency of the Storybooks that the Children enjoyed according to their Mothers (N = 8)

Name of Book	Frequency
Winnie the Witch by Korky Paul and Valerie Thomas	7
Traction Man is Here by Mini Grey	6
Again by Emily Gravett	6
The Lonely Beast by Chris Judge	6
The Pea and the Princess by Mini Grey	5

Table 11

Summary of the Measures upon Conclusion of Pilot Study 1

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS task • Statue Task • Gift Delay Task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive vocabulary subtest of the CELF-P2
Parent	SES and language environment	• Questionnaire adapted from the 'HK-UK Family Thinking Skills Study'
	Children's play behaviors in the home and parents' perceptions about play	• Parental questionnaire adapted from Fisher et al. (2008)
Teacher	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	Teacher Evaluation	• Teacher evaluation adapted from the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

4.2 Pilot Study 2: Suitability of the Design of the Intervention

Pilot study 2 was conducted in two reception classes at a primary school in a city in north east England. There were two aims for pilot study 2: (1) to increase comfortability in administering the intervention; and (2) to identify potential logistical problems that might arise during the intervention and while using the proposed measures.

4.2.1 Method.

4.2.1.1 Participants and Materials. The participants ($N = 10$) consisted of seven girls and three boys, two children had EAL ($M_{age} = 59$ months, $SD_{age} = 4.8$ months). Copies of the information pamphlet (Appendix E), opt-in consent form (Appendix F), and the questionnaire were sent home with the 43 children in the two reception classes.

4.2.1.2 Procedure. During Pilot Study 1, I noted that the children were more at ease and eager to participate in the assessments during the second session, which may have been due to their greater familiarity with me than in the first session. Consequently prior to administering the pre-tests, I immersed myself in the reception classrooms for a couple of days so as to get better acquainted with the children. I began administering the pre-tests for one week, followed by conducting eight sessions of the intervention that took place over a three-week period in two groups of five children each. The children were randomly allocated to the guided play intervention or the art activities group. Due to the small sample size, a third passive control group could not be included in the study. Moreover, given the aims of the study and the time constraints, the children only received eight sessions of the intervention instead of the 16 sessions as proposed in the main study. Consequently, the children were only read two storybooks and thus received explicit phonological awareness and vocabulary instruction for 36 target words in total, 18 target words per book. The delivery of the four sessions for each storybook was the same as the protocol outlined in Table 4 on page 44. Finally, the post-tests were conducted over a duration of one week.

The measures used in this study were the same as in Pilot Study 1. Additionally, the Checklist from the 'Think-Art! Study' (Ellefson & Hughes, 2011) was used to control for the children's engagement with the guided play intervention and the art activities. In addition, the teachers completed an *evaluation* of the children's skills over the course of the intervention that was adapted from the 'HK-UK Family Thinking Skills Study' (Appendix D). The measures that were used in pilot study 2 are summarized in Table 12.

Table 12

Measures used in Pilot Study 2

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS Task • Statue Task • Gift Delay Task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive Vocabulary subtest of the CELF-P2
	Assessment of children's engagement during the time period of the intervention	• Checklist from the 'Think-Art! Study'
Parent	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	SES and language environment	• Questionnaire adapted from the 'HK-UK Family Thinking Skills Study'
	Children's play behaviors in the home and parents' perceptions about play	• Parental questionnaire adapted from Fisher et al. (2008)
Teacher	Teacher Evaluation	• Teacher evaluation adapted from the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

4.2.2 Results and Discussion. The children seemed to enjoy partaking in the intervention irrespective if they were randomized to the guided play or the art activities group. In terms of the aims of pilot study 2, which were to increase comfortability in administering the intervention and to identify potential logistical problems that might arise during the intervention and while using the proposed measures, the explicit phonological awareness and vocabulary instruction for Tier One words were too easy for all the children including those with EAL. The children were already aware of both the phonological awareness and the vocabulary of the target words. As a result, I decided to provide explicit phonological awareness and vocabulary instruction for Tier Two and Tier Three words in the main study as these words would allow for the examination of the development and enhancement of the children's language skills over the duration of the intervention. Beck et al. (2013) define Tier

Two words as those that are often used by mature language users and are available across different domains. Tier Three words include those that are used infrequently and are found in specific domains such as hobbies and weather.

With regards to the low recruitment of the study, only parents of 10 out of 43 children consented for their child to be included in the study, so I decided to use an opt-out consent form (Appendix G) instead of an opt-in consent form in the main study as the components of the intervention- storybook reading, roleplaying or act-activities, and review- were undertakings that were typically incorporated into the classroom routine although not integrated together. The use of the opt-out consent form was also in compliance with the guidelines of the University of Cambridge Faculty of Education. In terms of the appropriateness of the measures used, the results of pilot study 2 demonstrated that the Statue Task was an appropriate measure for this sample as all the children were eager to participate in the assessment. The checklist from the 'Think-Art! Study' however was a difficult measure to use to control for the children's engagement with the guided play intervention and the art activities. This difficulty arose because I was unable to collect sufficient information to answer all 25 behaviors for each of the children and consequently the measure was not used in the main study. The descriptive statistics for the pre-test and post-test scores of the direct measures are shown in Table 13 and Table 14 respectively. The data from the post-test scores that were missing were missing completely at random as the children were absent from school. Based on the findings of pilot study 2, revisions were made to the study's measures that are summarized in Table 15. Appendix H consists of a list of measures that were considered but were later excluded from the study.

Table 13

Descriptive Statistics of Pre-Test Scores for Pilot Study 2

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Pre-Test ST	10	7	30	20.00	8.26	-.43 (.69)	-1.39 (1.33)
Pre-Test HTKS	10	4	40	18.70	11.85	.98 (.69)	.20 (1.33)
Pre-Test GD	10	2	5	4.00	1.16	-.54 (.69)	-1.39 (1.33)
Pre-Test PA	10	2	21	11.80	6.56	-.07 (.69)	-1.21 (1.33)
Pre-Test EV	10	4	26	18.90	6.28	-1.57 (.69)	3.13 (1.33)

Abbreviations: ST, Statue Task; HTKS, Head, Toes, Knees and Shoulders Task; GD, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 14

Descriptive Statistics of Post-Test Scores for Pilot Study 2

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Post-Test ST	10	1	30	21.50	10.67	-1.39 (.69)	.45 (1.33)
Post-Test HTKS	9	11	52	26.00	16.34	.67 (.72)	-1.39 (1.40)
Post-Test GD	8	1	4	3.13	1.13	-1.11 (.75)	.29 (1.48)
Post-Test PA	10	0	22	11.30	8.49	-.30 (.69)	-1.71 (1.33)
Post-Test EV	9	2	31	19.78	10.38	-.82 (.72)	-.43 (1.40)

Abbreviations: ST, Statue Task; HTKS, Head, Toes, Knees and Shoulders Task; GD, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 15

Summary of the Measures upon Conclusion of Pilot Study 2

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS task • Statue Task • Gift Delay Task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive vocabulary subtest of the CELF-P2
Parent	SES and language environment	• Questionnaire adapted from the 'HK-UK Family Thinking Skills Study'
	Children's play behaviors in the home and parents' perceptions about play	• Parental questionnaire adapted from Fisher et al. (2008)
Teacher	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	Teacher Evaluation	• Teacher evaluation adapted from the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

4.3 Analytical Plans that were changed based on the Reality of Data Collection

There were unexpected practical constraints in the research process that resulted in changes to the main study. My study aimed to answer the following research questions:

1. What is the relationship between children's self-regulation, language, and pre-literacy skills upon entry into reception?
2. What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, and pre-literacy skills of 4- to 5-year-olds with EAL?
3. What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills?
4. What is the frequency of pretend play in parent-child interactions amongst families whose children have EAL?
5. What are parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills?

Questions four and five were dependent on the data collected from the pre- and post-test responses on the parental questionnaire adapted from the study by Fisher et al. (2008). However due to a low response rate, I was unable to receive adequate responses to the parental questionnaire and consequently, questions four and five could not be addressed in the main study. This low response rate occurred despite my best efforts to increase the number of responses to the questionnaire. I had set up sessions at each of the school's drop-off and pick-up times when the parents had a chance to complete the questionnaire either in hard copy or complete the Qualtrics form using an iPad, but not a single parent came to the sessions. Thus, my study only addressed questions one to three.

Additionally, given the lack of responses to the questionnaire adapted from the 'HK-UK Family Thinking Skills Study', I was also unable to collect data on the family's SES, age of the parents, family composition, languages spoken at home, parents' level of education and employment status, parents' marital status, ethnicity, frequency of home reading, length of stay in the UK, and prior childcare experience. As such these possible explanatory variables could not be included in the analysis for questions one and two. Moreover, there was a misunderstanding by one of the teachers in School I and consequently, I was unable to analyze the responses to the Pre-Literacy Rating Scale of the CELF-P2 and the teacher evaluation for the children from School I. As a result, questions one and two were analyzed in two parts, data from all three schools and data from Schools II and III. Furthermore, questions three only involved the analysis of data from Schools II and III.

Moreover, in the summer before beginning data collection in Schools II and III, I realized that given the relationship between children's self-regulation and working memory skills, it would be beneficial to include a working memory measure for the children in Schools II and III. I needed a robust measure of working memory that was suitable for 4- to 5-year-olds that would take maximum 10 minutes to administer in addition to the other measures that were included in Session B (Table 4 on page 44). Consequently, I decided to use the *Spin the Pots Task* as used in other studies to measure the children's working memory skills (Hughes & Ensor, 2010). The procedure was adapted from that used by Beck, Schaefer, Pang, and Carlson (2011) and the props consisted of 12 visually distinct jewelry boxes that were arranged on a lazy Susan tray, 10 gems, 10 stickers, and a kitchen towel. I would say,

> *"We are going to play a game, and you can win lots of stickers. Let us open each of these boxes. Now we will put a gem in 10 of them, like this [a gem was placed in all but two of the boxes]. We have not got enough gems for all the boxes, so these two boxes are empty. Now I will cover it up like this [places kitchen towel over tray]. Now, we are going to spin the tray, and I want you to choose a box. Show me which box you want to open."*

When the child chose a box, the remaining boxes were covered with the kitchen towel and were ready for the next trial. The children were congratulated and encouraged after each trial and were rewarded with one sticker for every gem they found. The task ended when all 10 gems had been found or when the maximum of 20 trials was reached. The children's performance scores were calculated as the number of gems found divided by the number of trials taken and was scored by a final year undergraduate student. Table 16 contains the list of measures that were used for the two assessment sessions, Session A and Session B for all three schools.

Table 16

Measures that were used in the Two Assessment Sessions for Schools II and III

School	Session	Measures
I	A	• Statue Task • Phonological Awareness subtest of the CELF-P2 • Gift Delay Task
	B	• Head, Toes, Knees and Shoulders Task • Expressive Vocabulary subtest of the CELF-P2
II	A	• Statue Task • Phonological Awareness subtest of the CELF-P2 • Gift Delay Task
	B	• Head, Toes, Knees and Shoulders Task • Expressive Vocabulary subtest of the CELF-P2 • Spin the Pots Task

The next chapter will present the results from the data collected from all three schools as they relate to the study's research questions.

Chapter Five

Analysis One – Children's Self-Regulation and Language Skills

There is a lack of studies that examine the relationship between guided play with elements of pretense and the development of children's self-regulation skills (Lillard et al., 2013). Children have a wide variation in their self-regulation skills in early childhood that have been shown to predict their school readiness and academic achievement in the short- and long-term (McClelland et al., 2012). The development of children's self-regulation skills is affected by other factors such as gender and language skills. Previous studies have shown that between the ages of four and seven, girls have higher self-regulation skills than boys (Matthews et al., 2009; Matthews et al., 2014; McClelland et al., 2007) but the reason for these gender differences remains unclear. Additionally, language skills can impact how self-regulation skills develop in children. Language provides children with the mental tools to organize and modify their thoughts and behaviors (Vygotsky, 1986). During early childhood, expressive language in particular may increase the chances for the child to recognize their own state of mind and manipulate it to the specific context and requirements of the task at hand (Cole, Armstrong, & Pemberton., 2010).

This chapter will address two research questions – What is the relationship between children's self-regulation, and language skills upon entry into reception? What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation and language skills of 4- to 5-year-olds with EAL? I will analyze and discuss the data including the pre- and post-test scores of the Head, Toes, Knees and Shoulders Task, and the children's phonological awareness and expressive vocabulary skills that were collected from all three schools. The chapter is divided into four sections: (1) method; (2) results; (3) discussion; and (4) conclusion.

5.1 Method

5.1.1 Participants. The sample of the children (N = 151) consisted of 77 boys, 70 children with EAL (M_{age} = 63.54 months, SD_{age} = 3.7 months). There were 53 children in the guided play group (28 boys, 29 children with EAL, 12 children grouped based on ability as determined by the school). There were 49 children in the art activities group (25 boys, 29 children with EAL, 12 children grouped based on ability as determined by the school). There were 49 children in the typical curriculum group (25 boys, 12 children with EAL, all children were randomly assigned to the group).

Twenty-four were excluded from the study: one child did not want to participate, seven parents opted for their children to not participate in the study, two children were non-verbal, four children left the schools, three children had a developmental delay, four children had behavioral problems, one child was epileptic, one child was diagnosed with a speech language impairment, and one child was hearing impaired. Originally, in order to attain an adequate sample size, one school had agreed to participate in the study for two academic years. However, this school withdrew from the study after the first academic year. Consequently, I spent time recruiting two other schools to participate in the project to ensure that I obtained the required sample size of 160 children. As a result, the study was done in three schools. There were two classes of students from School I, one class of students from School II, and three classes of students from School III that were included in the study.

5.1.2 Design and Procedures. In groups of five or six, the children received sixteen 30-minutes sessions of the intervention. The intervention was based on three components: (1) shared storybook reading; (2) roleplaying or participating in art activities; and (3) review (Table 4 on page 44). The children were read four storybooks over the duration of the intervention and each storybook was repeated four times. The children received explicit phonological awareness and expressive vocabulary instruction for 72 words in total, 18 words per book. Practical constraints in the school setting limited the random allocation of the students to the guided play or the art activities group. In School I, teaching was done by ability groups. To avoid disrupting the classroom schedule, I administered the intervention to the students as per their ability groups. Consequently, in School I the allocation to the experimental (guided play intervention) or active control group (art activities) was done by ability group. On the contrary, for Schools II and III random allocation to the experimental (guided play intervention) or active control group (art activities) was conducted using the class lists as this method did not cause disruption to the children's classroom schedule for these schools. A third passive control group (typical curriculum) was also included in the study. Table 17 outlines the breakdown of the groups across the three schools.

Table 17

Groups from the Three Schools in the Study

School I	School II	School III
Experimental Group – Guided Play Group	Experimental Group – Guided Play Group	Experimental Group – Guided Play Group
Active Control Group – Art Activities Group	Active Control Group – Art Activities Group	Active Control Group – Art Activities Group
		Passive Control Group – Typical Curriculum

To comply with the time constraints of the academic year and the numbers of students within the schools, Schools I and II included two groups: (1) the experimental group – guided play; and (2) the active control group – art activities. School III included all three groups: (1) the experimental group – guided play; (2) the active control group – art activities; and (3) the passive control group – typical curriculum. Another aspect that differed between the three schools was the time that it took for the administration of the sixteen sessions of the intervention. It took 13 weeks to administer the sessions in School I, 16 weeks to run the sessions in School II, and 15 weeks to carry out the sessions in School III. This variation was the result of the scheduling needs of each school.

5.1.3 Materials. Table 18 notes the measures that were analyzed across all three schools. Refer to Section 3.10 on pp. 50-53 for a description of all the measures used and their scoring in the study.

Table 18

Measures that were analyzed across the Three Schools

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	HTKS task
		Statue Task
		Gift Delay Task
	Phonological awareness in English	Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	Expressive vocabulary subtest of the CELF-P2

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

5.1.4 Data processing and analysis. The data on all measures were collected on-site at all three schools at two time points: (1) before the intervention was carried out; and (2) following the completion of the 16 sessions of the intervention. All of the data were managed in SPSS and were analyzed using R. The raw data were used for all of the analysis as per the recommendations of the Education Endowment Foundation (2015). In terms of missing data, the missing observations resulted from children being absent on the day of data collection. This is assumed to be random. Linear regression was used to impute the missing values based on known predictors of the missing variable. Using an iterative process, the regression equation was calculated using cases where the complete data for the predictor variables were available. In terms of the pre-test scores, there were three missing values for the Head, Toes, Knees and Shoulders Task, and three missing values for expressive vocabulary. In terms of the post-test scores, there were two missing values for the Head, Toes, Knees and Shoulders Task, two missing values for expressive vocabulary, and five missing values for phonological awareness. The regression equations that were used for the missing data are shown in Table 19.

Table 19

Regression Equations for Missing Data for All Three Schools

Measure	Equation
Pre-test scores on the HTKS Task	Pre-test scores on the HTKS Task = -101 + 1.89(Age)
Post-test scores on the HTKS Task	Post-test scores on the HTKS Task = -32 + .21(Age) + .69(Pre-test scores on the HTKS Task)
Pre-test scores on EV	Pre-test scores on EV = 3 + .14(Age) + .23(Pre-test scores on the HTKS Task)
Post-test scores on EV	Post-test scores on EV = 2 + .09(Age) + .77(Pre-test scores on EV) - .005(Pre-test scores on the HTKS Task)
Post-test scores on PA	Post-test scores on PA = -8 +.27(Age) + .51(Pre-test scores on PA)

Abbreviations: HTKS, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness.

With regards to the first research question about *the relationship between children's self-regulation and language skills upon entry into reception*, there were four steps in the data analysis process: (1) T-tests for examining the effects of gender and EAL status; (2) Simple Linear Regression analysis for examining the effect of age; (3) Spearman's correlation

between the three self-regulation measures (The Statue Task, the Head, Toes, Knees and Shoulders Task, and the Gift Delay Task); (4) Path analysis of the children's scores on the Head, Toes, Knees and Shoulders Task, phonological awareness and expressive vocabulary. First, the t-tests were conducted to examine if there was a significant difference between the means at baseline with regards to gender and EAL status for the pre-test scores on the Statue Task; the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary. Then, simple linear regression analysis was done to show the relationship between the children's age in months and their pre-test scores on the Statue Task; the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary.

Additionally, Spearman's correlation was carried out between the pre-test scores of the three self-regulation measures (the Statue Task, the Head, Toes, Knees and Shoulders Task, and the Gift Delay Task) to measure the strength and direction of the association between the measures as the data were not normally distributed. Table 20 and Table 22 has the descriptive statistics of the pre-test and post-test scores respectively for the measures analyzed from all three schools. Table 21 and Table 23 has the descriptive statistics of the pre-test and post-test scores respectively for the measures analyzed from all three schools by group. Finally, path analysis was used to provide estimates of the magnitude and significance of the hypothesized relations between gender; EAL status; the Head, Toes, Knees and Shoulders Task; phonological awareness; and expressive vocabulary. Given the results of the Spearman's correlation between the three self-regulation measures, the pre-test scores of the Statue Task and the Gift Delay Task were not included in the path analysis. This will be explained in the next chapter. Two models of the path analysis were carried out: (i) One model without children's age in accordance with Vygotskian theory; and (ii) One model with children's age to examine the relations between age; the Head, Toes, Knees and Shoulders Task; phonological awareness; and expressive vocabulary. The second model with age was run due to reliable differences across age within the same year. Since the pre-test scores of the measures were not-normally distributed (Table 20), ranking was used to transform the data whereby the numerical values were replaced by their rank to carry out the path analysis. Figures 1 and 2 present the input path diagram for the data from all three schools without age and with age respectively.

Table 20

Descriptive Statistics of the Pre-Test Scores from All Three Schools

Variable	*n*	Min	Max	*M*	*SD*	Skewness	Kurtosis
Statue Task	151	0	30	16.55	9.70	-.27 (.20)	-.20 (.39)
HTKS Task	151	0	58	20.45	17.25	.31 (.20)	-1.13 (.39)
GD Task	151	0	4	2.33	1.03	-.14 (.20)	-.56 (.39)
Pre-Test PA	151	0	22	8.95	6.39	.14 (.20)	-1.03 (.39)
Pre-Test EV	151	0	36	16.44	8.38	.02 (.20)	-.73 (.39)

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 21

Descriptive Statistics of the Pre-Test Scores from All Three Schools by Group

Group	Variable	*n*	Min	Max	*M*	*SD*	Skewness	Kurtosis
Play	Statue Task	53	0	30	16.15	10.26	-.19 (.33)	-1.40 (.64)
Art	Statue Task	49	0	30	17.18	9.69	-.33 (.34)	-1.20 (.67)
TC	Statue Task	49	0	30	16.35	9.25	-.31 (.34)	-.93 (.67)
Play	HTKS Task	53	0	52	18.26	16.12	.44 (.32)	-1.09 (.64)
Art	HTKS Task	49	0	58	22.12	17.13	.33 (.34)	-.86 (.67)
TC	HTKS Task	49	0	56	21.14	18.62	.19 (.34)	-1.42 (.67)
Play	GD Task	53	0	4	2.26	1.00	-.09 (.33)	-.31 (.64)
Art	GD Task	49	0	4	2.27	1.13	-.19 (.34)	-.72 (.67)
TC	GD Task	49	1	4	2.47	.94	.01 (.34)	-.82 (.67)
Play	Pre-Test PA	53	0	20	7.51	6.38	.25 (.33)	-1.14 (.64)
Art	Pre-Test PA	49	0	22	10.29	6.35	.13 (.34)	-1.06 (.67)
TC	Pre-Test PA	49	0	22	9.16	6.23	.07 (.34)	-.95 (.67)
Play	Pre-Test EV	53	0	36	15.11	8.59	.05 (.33)	-.77 (.64)
Art	Pre-Test EV	49	3	32	15.98	7.33	.25 (.34)	-.75 (.67)
TC	Pre-Test EV	49	2	36	18.35	8.92	-.22 (.34)	-.62 (.67)

Abbreviations: TC, typical curriculum; HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 22

Descriptive Statistics of Post-Test Scores for All Three Schools

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Post-Test HTKS	151	0	60	27.26	18.11	-.15 (.20)	.20 (.39)
Post-Test PA	151	0	23	14.13	5.34	-.80 (.20)	.20 (.39)
Post-Test EV	151	2	37	19.97	8.23	-.23 (.20)	-.70 (.39)

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary.

Table 23

Descriptive Statistics of Post-Test Scores for All Three Schools by Group

Group		*n*	Min	Max	*M*	*SD*	Skewness	Kurtosis
Play	Post-Test HTKS	53	0	60	24.19	19.91	.28 (.33)	-1.32 (.64)
Art	Post-Test HTKS	49	0	54	30.73	15.82	-.48 (.34)	-.84 (.67)
TC	Post-Test HTKS	49	0	58	27.10	17.95	-.13 (.34)	-1.25 (.67)
Play	Post-Test PA	53	0	22	13.94	6.01	-.84 (.33)	-.11 (.64)
Art	Post-Test PA	49	4	23	15.33	4.25	-.61 (.34)	-.02 (.67)
TC	Post-Test PA	49	0	21	13.12	5.42	-.64 (.34)	.11 (.67)
Play	Post-Test EV	53	2	34	18.53	8.18	-.08 (.33)	-.57 (.64)
Art	Post-Test EV	49	2	37	20.10	8.48	-.13 (.34)	-.89 (.67)
TC	Post-Test EV	49	4	36	21.39	7.12	-.54 (.34)	-.26 (.67)

Abbreviations: TC, typical curriculum; HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary.

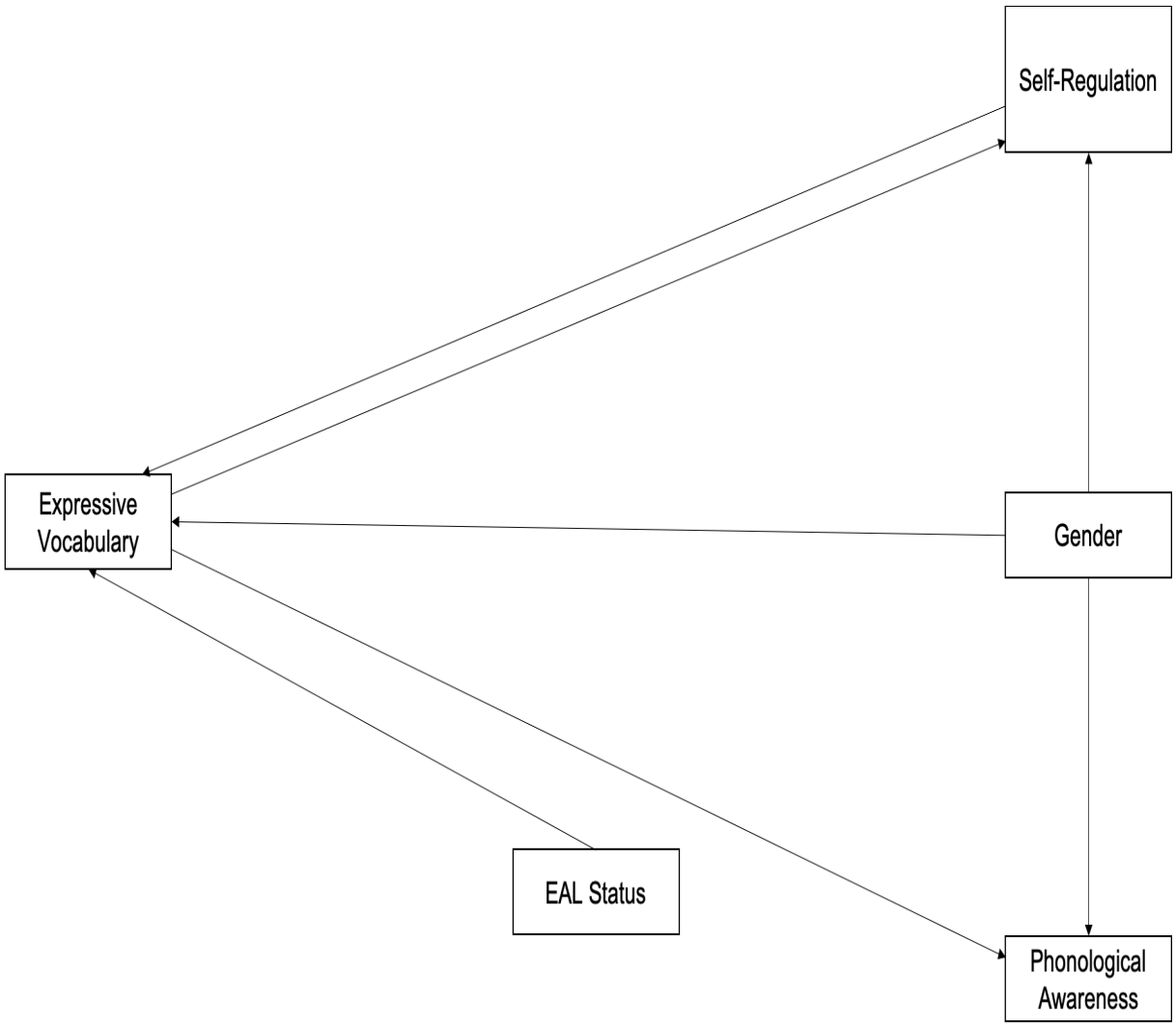

Figure 1. Input path model for data from all three schools at baseline without age.

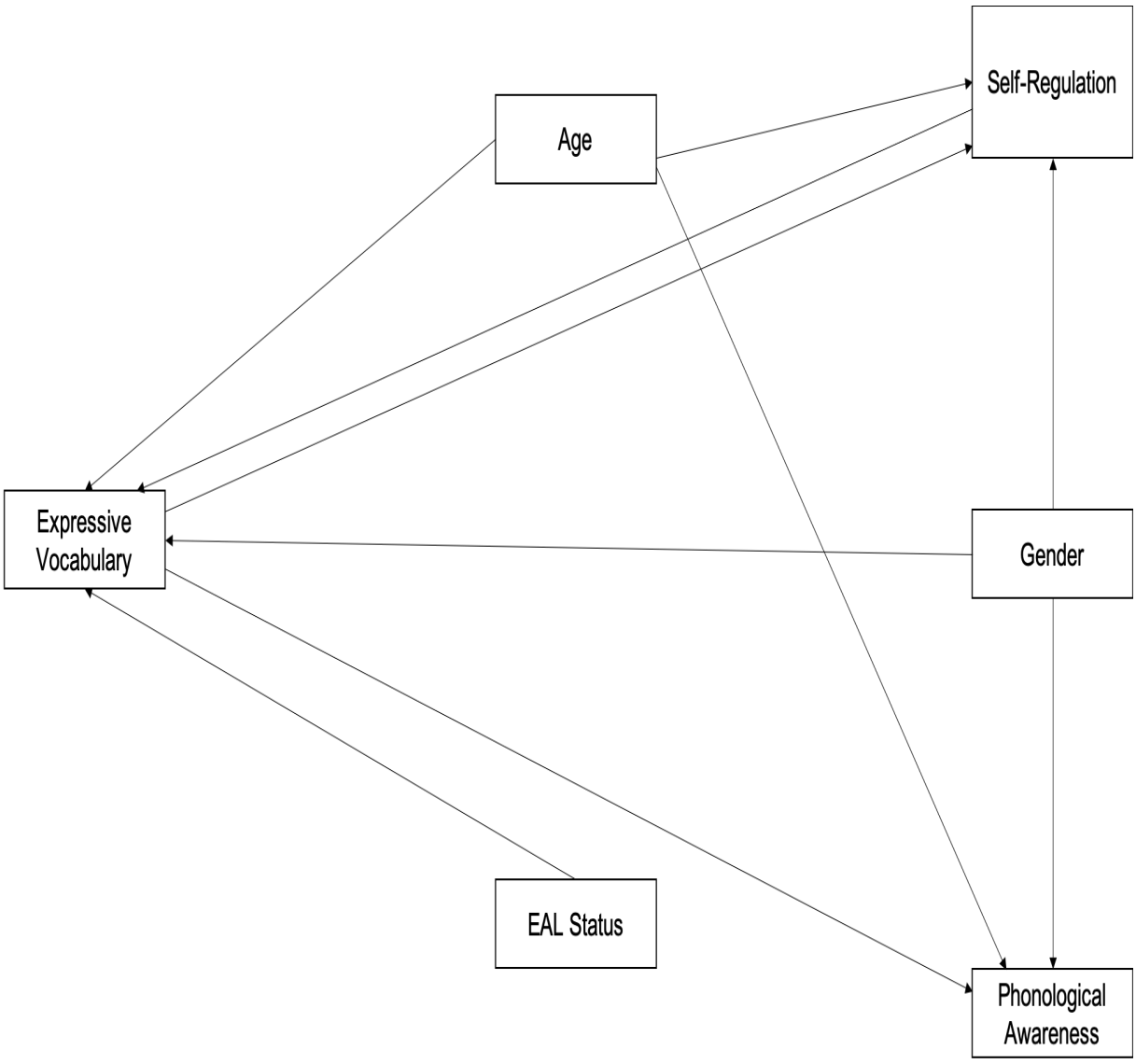

Figure 2. Input path model for data from all three schools at baseline with age.

The input path diagrams (Figures 1 and 2) were based on previous findings that have shown the effect of gender and age on children's self-regulation, phonological awareness, and expressive vocabulary skills (Chipere, 2014; Elias & Berk, 2002; McDowell, Lonigan, & Goldstein, 2007). Bohlmann et al. (2015) outline the relationship between children's self-regulation and expressive vocabulary skills. Other studies have also demonstrated the influence of gender on children's self-regulation, phonological awareness, and expressive vocabulary skills (Chipere, 2014; Sherman, 1967). Carlson and Meltzoff (2008) and Gámez, Griskell, Sobrevilla, and Vazquez (2019) highlight the effect of EAL status on children's expressive vocabulary skills.

As emphasized by Lillard et al. (2013), previous studies in the area of pretend play and children's development have been methodologically limited as replication and randomization were not conducted and the sample sizes were very small. Therefore, using these four

analytical steps to respond to the first research question about *the relationship between children's self-regulation and language skills upon entry into reception* was particularly important for ensuring methodological rigor. Additionally, as far as I am aware there has not been a study with 4- and 5-year-olds from low-income households and those with EAL that has examined children's self-regulation, phonological awareness and expressive vocabulary skills in tandem. This gap in the literature is significant as children develop these skills rapidly during the preschool years (Cheng and Johnson, 2010; Lillard et al., 2013) and examining the relationship between these variables at baseline contributes to the knowledge base of children's skills upon entering their first year of schooling.

In terms of the second research question inquiring about the *efficacy of using a* guided *play intervention with elements of pretense on the self-regulation, and language skills of 4- to 5-year-olds with EAL,* hierarchical regression analysis was carried out on the children's post-test scores of the Head, Toes, Knees and Shoulders Task, phonological awareness and expressive vocabulary skills. Hierarchical regression was used to examine how much variance of the children's post-test scores were accounted for by the children's age; gender; EAL status; pre-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; and expressive vocabulary, and the group that the children were in (play, art activities, or typical curriculum). I chose to use hierarchical regression over running an ANOVA for my analysis as hierarchical regression allows for the examination of a large number of potential predictor variables and I aimed to identify which variables had the most predictive power. I incorporated three categorical predictors (gender, EAL status, and group that the children were randomized into) into the regression model by imputing k-1 indicator variables. The imputation was conducted as contrary to an ANOVA model, a regression model cannot be conducted using categorical predictor variables. The hierarchical regression model effectively obtains the same results as an ANOVA model as there are lots of similarities in the procedures used to examine the underlying assumptions. Furthermore, the hierarchical regression analysis was imperative given that it was the first time that this particular intervention was used in schools.

The hierarchical regression was carried out twice: (i) Once without children's age in accordance with Vygotskian theory; and (ii) Once with children's age to examine how much variance of the children's post-test scores were accounted for by the age. The second model with age was run due to reliable differences across age within the same year. Since the pre-test scores of the measures were not-normally distributed (Table 20), the scores were transformed by replacing the numerical values with their relative rank to run the hierarchical

regression. I used three models for each hierarchical regression analysis with all of the post-test measures as outlined in Table 24 and 25.

Table 24

Models used in the Hierarchical Regression Analysis for Data from All Three Schools without Age

Model	Equation
1	Post-test scores on the tasks = Intercept + Gender + EAL Status
2	Post-test scores on the tasks = Intercept + Gender + EAL Status + Pre-test scores of the HTKS Task + Pre-test scores of PA + Pre-test scores of EV
3	Post-test scores on the tasks = Intercept + Gender + EAL Status + Pre-test scores of the HTKS + Pre-test scores of PA + Pre-test scores of EV + Group

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary.

Table 255

Models used in the Hierarchical Regression Analysis for Data from All Three Schools with Age

Model	Equation
1	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status
2	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status + Pre-test scores of the HTKS Task + Pre-test scores of PA + Pre-test scores of EV
3	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status + Pre-test scores of the HTKS + Pre-test scores of PA + Pre-test scores of EV + Group

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary.

5.2 Results

5.2.1 T-tests for gender and EAL status. Table 26 displays the results of the t-tests for gender with respect to the pre-test scores of the Statue Task, the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary. There was no significant difference in the pre-test scores of the Statue Task for males (M = 15.53, SD = 10.05) and females (M = 17.61, SD = 9.28); $t(149) = -1.27$, $p = .21$, small effect size. There was no significant difference in the pre-test scores of the Head, Toes, Knees and Shoulders Task for males (M = 18.45, SD = 17.28) and females (M = 22.53, SD = 17.09); $t(149) = -1.64$, $p = .10$, small effect size. There was no significant difference in the pre-test scores of the Gift Delay Task for males (M = 2.04, SD = 1.05) and females (M = 2.39, SD = 1.00); $t(149) = -.63$, $p = .53$, small effect size. There was no significant difference in the pre-test scores of phonological awareness for males (M = 6.63, SD = 6.20) and females (M = 9.89, SD = 6.48); $t(149) = -1.79$, $p = .07$, small effect size. There was a significant difference in the pre-test scores of expressive vocabulary for males (M = 14.51, SD = 9.39) and females (M = 18.46, SD = 7.92); $t(149) = -2.98$, $p = .003$, small effect size.

Table 26

T-Test Results for Pre-Test Scores of the Dependent Variables by Gender for All Three Schools

	Gender						95% CI for Mean Difference				
	Male			Female							
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*	*p*	*r*
Statue Task	15.53	10.05	77	17.61	9.28	74	-23.00, 5.03	-1.27	149	.21	.11
HTKS Task	18.45	17.28	77	22.53	17.09	74	-25.43, 2.37	-1.64	149	.10	.12
GD Task	2.04	1.05	77	2.39	1.00	74	-17.80, 9.23	-.63	149	.53	.06
PA	6.63	6.20	77	9.89	6.48	74	-3.89, .19	-1.79	149	.07	.15
EV	14.51	9.39	77	18.46	7.92	74	-6.58, -1.33	-2.98	149	.003	.24

Note. r = .10, small effect size; r = .30, medium effect size; r =.50, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

Table 27 displays the results of the t-tests for EAL status with respect to the pre-test scores of the Statue Task; the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary. There was no significant difference in the pre-test scores of the Statue Task for native English speakers (M = 16.06, SD = 9.41) and children with EAL (M = 17.11, SD = 10.06); $t(149) = -.81$, $p = .42$, small effect size. There was a significant difference in the pre-test scores of the Head, Toes, Knees and Shoulders Task for native English speakers (M = 23.25, SD = 17.50) and children with EAL (M = 17.21, SD = 16.50); $t(149) = 2.32$, $p = .02$, small effect size. There was a significant difference in the pre-test scores of the Gift Delay Task for native English speakers (M = 2.14, SD = .98) and children with EAL (M = 2.56, SD = 1.03); $t(149) = -2.73$, $p = .01$, small effect size. There was no significant difference in the pre-test scores of phonological awareness for native English speakers (M = 9.85, SD = 6.03) and children with EAL (M = 7.90, SD = 6.66); $t(149) = 1.88$, $p = .06$, small effect size. There was a significant difference in the pre-test scores of expressive vocabulary for native English speakers (M = 20.30, SD = 7.28) and children with EAL (M = 11.99, SD = 7.31); $t(149) = 6.98$, $p < .001$, medium effect size.

Table 27

T-Test Results for Pre-Test Scores of the Dependent Variables by EAL Status for All Three Schools

	EAL Status						95% CI for Mean Difference				
	Not EAL			EAL							
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*	*p*	*r*
Statue Task	16.06	9.41	81	17.11	10.06	70	-20.04, 8.40	-.81	149	.42	.05
HTKS Task	23.25	17.50	81	17.21	16.50	70	2.41, 30.05	2.32	149	.02	-.18
GD Task	2.14	.98	81	2.56	1.03	70	-31.58, -5.06	-2.73	149	.01	.21
PA	9.85	6.03	81	7.90	6.66	70	-.11, 4.01	1.88	149	.06	-.15
EV	20.30	7.28	81	11.99	7.31	70	5.96, 10.66	6.98	149	< .001	-.50

Note. r = .10, small effect size; r = .30, medium effect size; r =.50, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

5.2.2 Simple linear regression analysis for age. Table 28 displays the results of the regression analysis for age with respect to the pre-test scores of the Statue Task; the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary. A simple linear regression was calculated to predict the pre-test scores of the Statue Task; the Head, Toes, Knees and Shoulders Task; the Gift Delay Task; phonological awareness; and expressive vocabulary by age. Age significantly predicted the pre-test scores of the Statue Task ($\beta = 2.18$, $p = .02$), small effect size. Age significantly predicted the pre-test scores of the Head, Toes, Knees and Shoulders Task ($\beta = 5.70$, $p < .001$), small effect size. Age did not significantly predict the pre-test scores of the Gift Delay Task, ($\beta = -1.40$, $p = .13$), small effect size. Age significantly predicted the pre-test scores of phonological awareness, ($\beta = .49$, $p < .001$), small effect size. Age significantly predicted the pre-test scores of expressive vocabulary, ($\beta = .65$, $p < .001$), small effect size.

Table 28

Simple Linear Regression Results for the Pre-Test Predictors by Age for All Three Schools

Predictor	*β*	*SE*	*p*	Adjusted r^2
Statue Task	2.18	.94	.02	.03
HTKS Task	5.70	.83	< .001	.23
GD Task	-1.40	.91	.13	.01
PA	.49	.13	< .001	.07
EV	.65	.18	< .001	.08

Note. Adjusted $r^2 = .10$, small effect size; Adjusted $r^2 = .36$, medium effect size; Adjusted $r^2 = .51$, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task; PA, phonological awareness; EV, expressive vocabulary.

5.2.3 Spearman's correlations between the self-regulation measures. Table 29 notes the correlation between the three self-regulation measures. There were no multivariate outliers. The strongest correlation was between the Statue Task and the Head, Toes, Knees and Shoulders Task: $r(149) = .28$, $p < .01$, small effect size. There was also a negative correlation between the Head, Toes, Knees and Shoulders Task and the Gift Delay Task: $r(149) = -.21$, $p < .01$, small effect size. There was not a significant correlation between the Statue Task and the Gift Delay Task: $r(149) = .13$, $p > .05$, small effect size.

Table 29

Spearman's Correlation of the Pre-Test Scores of the Statue Task, the HTKS, and the GD Task for All Three Schools

Measure	1	2
Statue Task (1)		
HTKS Task (2)	.28**	
GD Task	.13	-.21**

Note. ** p < .01

Note. r = .10, small effect size; r = .30, medium effect size; r =.50, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; GD Task, Gift Delay Task.

5.2.4 Path analysis of the dependent variables at baseline. The correlation between the variables is shown in Table 30, and the coefficient (β), standard error (*SE*), p-value (p), and the standardized path coefficients (Std.all) for each of the predictors are shown in Table 31 (model without age) and Table 32 (model with age). The results suggest that the pre-test scores on the Head, Toes, Knees and Shoulders Task; phonological awareness; and expressive vocabulary are interrelated. The output path diagram for the model without age is presented in Figure 3. The results of the path analysis of the data from all three schools without age are shown in Table 31. With regards to the pre-test scores on the Head, Toes, Knees and Shoulders Task, the pre-test scores on expressive vocabulary (β = .36, p = .01) was a significant predictor. There was a medium effect size for pre-test scores on expressive vocabulary predicting children's pre-test scores on the Head, Toes, Knees and Shoulders Task. Gender was not a significant predictor of the children's pre-test scores on the Head, Toes, Knees and Shoulders Task (β = 4.74, p = .48). In terms of the pre-test scores on phonological awareness, pre-test scores on expressive vocabulary (β = .39, p < .001) were a significant predictor with a medium effect size. Gender was not a significant predictor of the children's pre-test scores on phonological awareness (β = 5.32, p = .42). In connection with the pre-test scores on expressive vocabulary, gender (β = 14.51, p = .01) and EAL status (β = -41.03, p < .001) were significant predictors with girls and native English speakers outperforming boys and children with EAL. There was a small effect size for gender predicting children's pre-test scores on expressive vocabulary, and a medium effect size for EAL status predicting children's pre-test scores on expressive vocabulary. Pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .18, p = .16) were not a significant predictor of the children's pre-test scores on expressive vocabulary.

The results of the path analysis of the data from all three schools with age are shown in Table 32. The output path diagram for the model with age is presented in Figure 4. With regards to the pre-test scores on the Head, Toes, Knees and Shoulders Task, age ($\beta = 4.67$, $p < .001$) and pre-test scores on expressive vocabulary ($\beta = .27$, $p = .05$) were significant predictors. There was a medium effect size for age predicting children's pre-test scores on the Head, Toes, Knees and Shoulders Task, and a small effect size for pre-test scores on expressive vocabulary predicting children's pre-test scores on the Head, Toes, Knees and Shoulders Task. Gender was not a significant predictor of the children's pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = 2.76$, $p = .65$). In terms of the pre-test scores on phonological awareness, age ($\beta = 2.15$, $p = .02$) and pre-test scores on expressive vocabulary ($\beta = .33$, $p < .001$) were significant predictors with a small effect size for age and a medium effect size for children's pre-tests scores on expressive vocabulary. Gender was not a significant predictor of the children's pre-test scores on phonological awareness ($\beta = 4.73$, $p = .47$). In connection with the pre-test scores on expressive vocabulary, gender ($\beta = 13.29$, $p = .02$) and EAL status ($\beta = -39.76$, $p < .001$) were significant predictors with girls and native English speakers outperforming boys and children with EAL. There was a small effect size for gender predicting children's pre-test scores on expressive vocabulary, and a medium effect size for EAL status predicting children's pre-test scores on expressive vocabulary. Age ($\beta = 1.91$, $p = .08$) and pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .17$, $p = .24$) were not significant predictors of the children's pre-test scores on expressive vocabulary.

Table 30

Pearson's Correlation for the Variables in the Path Analysis of Baseline Data at All Three Schools

Variable	1	2	3	4	5
Pre-Test HTKS (1)					
Pre-Test PA (2)	.47**				
Pre-Test EV (3)	.53**	.40**			
Age (4)	.49**	.29**	.31**		
Gender (5)	.13	.15	.22**	.10	
EAL Status	-.19*	-.16	-.51**	-.11	-.06

Note. * p < .05, ** p < .01

Note. *r* = .10, small effect size; *r* = .30, medium effect size; *r* =.50, large effect size

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary.

Table 31

Path Analysis Results for the Baseline Data for All Three Schools without Age

Variable	*β*	*SE*	*p*	Std.all
Pre-Test HTKS Task				
Gender	4.74	6.70	.48	.06
Pre-Test EV	.36	.14	.01	.36
Pre-Test PA				
Gender	5.32	6.63	.42	.06
Pre-Test EV	.39	.08	< .001	.39
Pre-Test EV				
Gender	14.51	5.61	.01	.17
EAL	-41.03	5.82	< .001	-.47
Pre-Test HTKS Task	.18	.13	.16	.18

Note. Std.all refers to the standardized path coefficients

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness.

Table 32

Path Analysis Results for the Baseline Data for All Three Schools with Age

Variable	*β*	*SE*	*p*	Std.all
Pre-Test HTKS Task				
Age	4.67	.87	< .001	.40
Gender	2.76	6.05	.65	.03
Pre-Test EV	.27	.14	.05	.27
Pre-Test PA				
Age	2.15	.90	.02	.18
Gender	4.73	6.51	.47	.05
Pre-Test EV	.33	.08	< .001	.33
Pre-Test EV				
Age	1.91	1.07	.08	.16
Gender	13.29	5.46	.02	.15
EAL	-39.76	5.64	< .001	-.46
Pre-Test HTKS Task	.17	.14	.24	.17

Note. Std.all refers to the standardized path coefficients

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness.

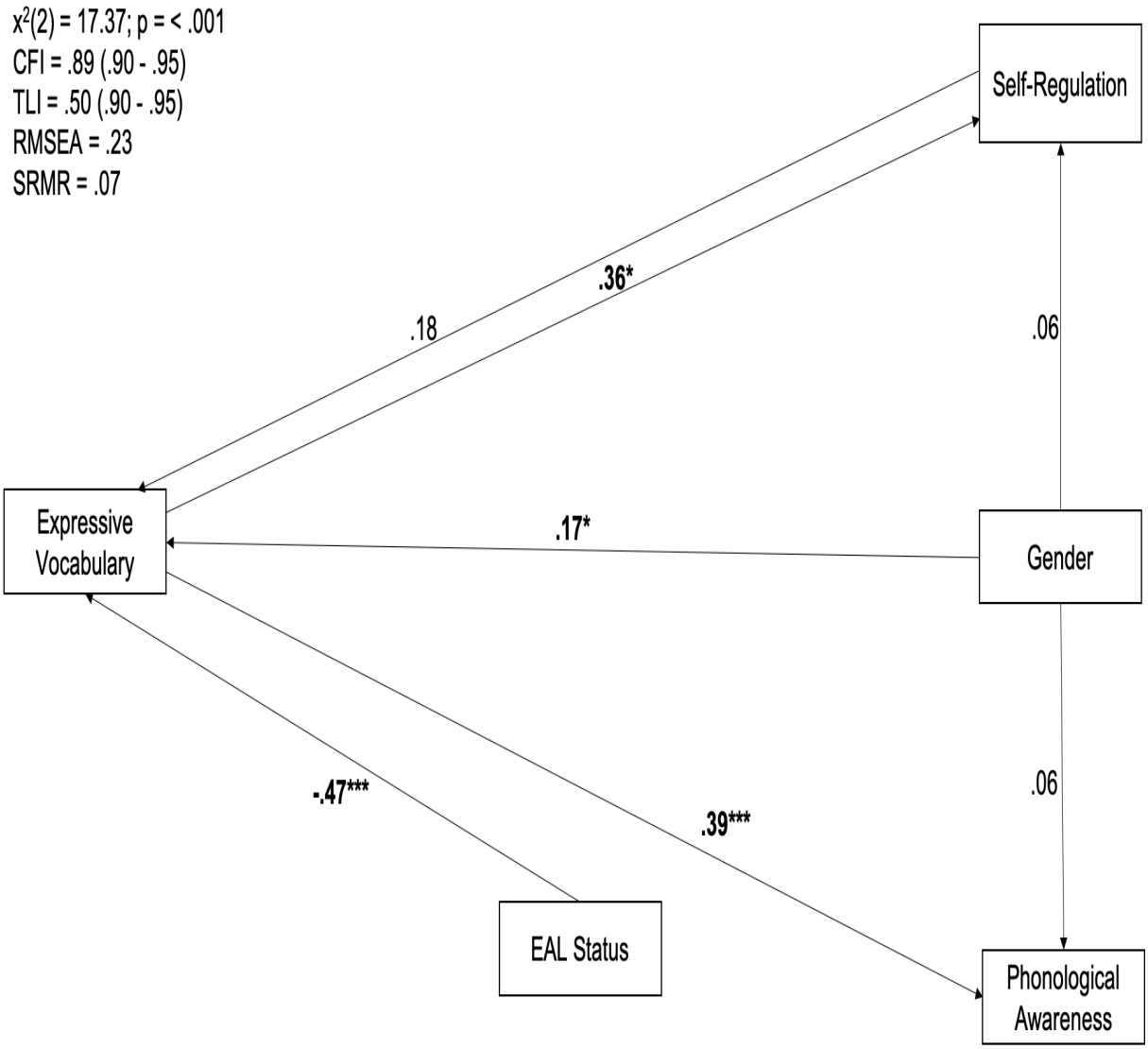

Figure 3. The output diagram of the baseline data from all three schools without age. Fit indices for Path Analysis with Factor Loads; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean-square Residual.

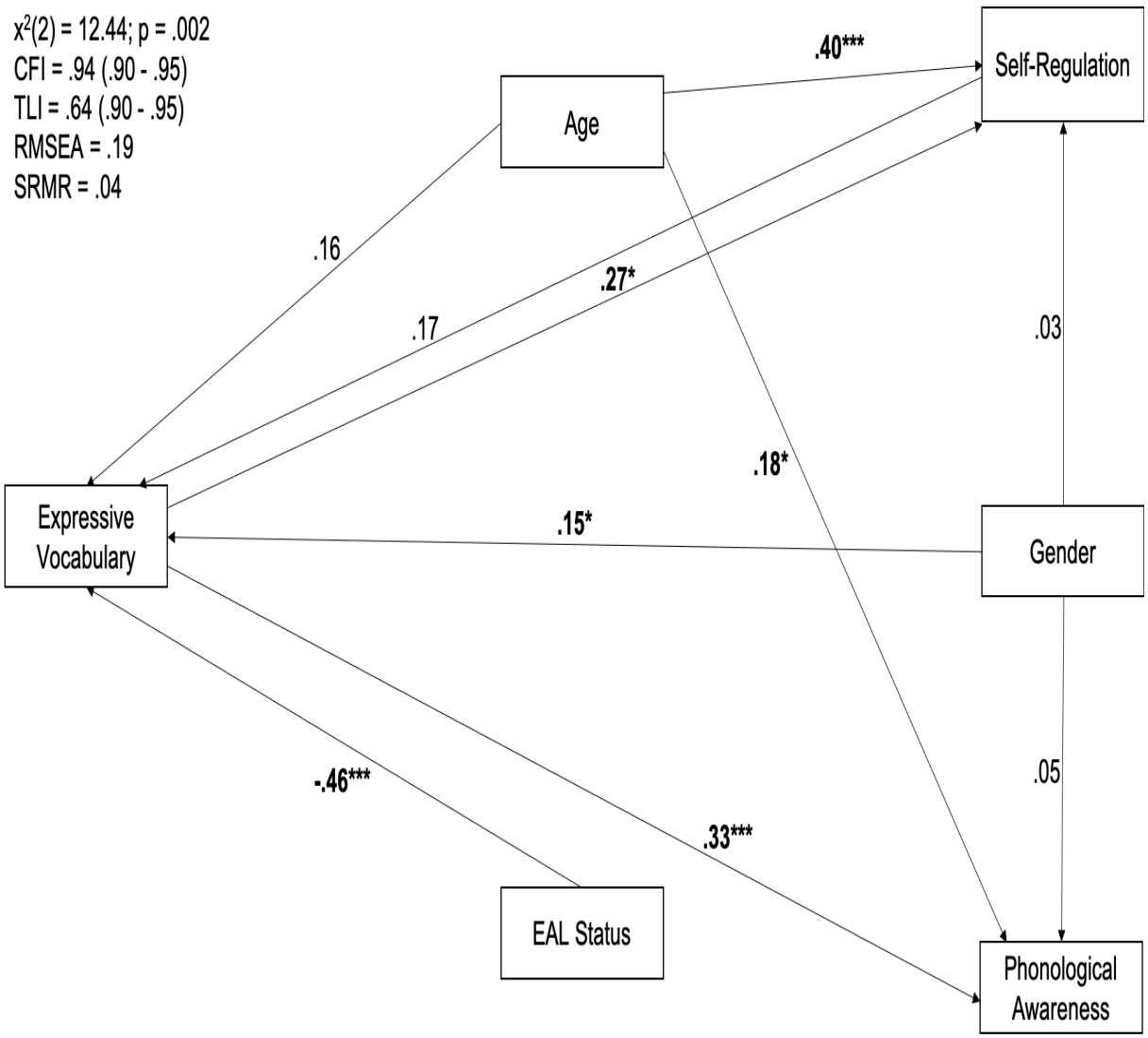

Figure 4. The output diagram of the baseline data from all three schools with age. Fit indices for Path Analysis with Factor Loads; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean-square Residual.

5.2.5 Hierarchical regression for the post-test scores of the dependent variables.

The results of the hierarchical regression analysis for all three schools without age are outlined in Tables 33-35. For the hierarchical regression analysis of the post-test scores of the Head, Toes, Knees and Shoulders Task (Table 33), Model 2 was the best fitting model with the pre-test scores on phonological awareness ($\beta = .18$, $p = .003$) and pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .59$, $p < .001$) found to be significant predictors. The group the children were randomized to was not a significant predictor of children's post-test scores on the Head, Toes, Knees and Shoulders Task. In terms of the effect size for Model 2 for the post-test scores of the Head, Toes, Knees and Shoulders Task, the adjusted $R^2 = .60$ demonstrated that there was a large effect.

For the hierarchical regression analysis of the post-test scores of phonological awareness without age (Table 34), Model 3 was the best fitting model with the pre-test scores on phonological awareness ($\beta = .55$, $p < .001$) and pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .21$, $p = .003$) found to be significant predictors. Additionally, the group into which the children were randomized was a significant predictor of children's post-test scores of phonological awareness as children in the guided play group outperformed the children in the typical curriculum group ($\beta = -20.43$, $p < .001$). In terms of the effect size for Model 3 for the post-test scores of phonological awareness, the adjusted $R^2 = .54$ demonstrated that there was a large effect.

For the hierarchical regression analysis of the post-test scores of expressive vocabulary without age (Table 35), Model 2 was the best fitting model with EAL status ($\beta = -14.97$, $p = .003$) and pre-test scores on expressive vocabulary ($\beta = .64$, $p < .001$) found to be significant predictors. Native English speakers outperformed children with EAL on their post-test scores of expressive vocabulary. The group that the children were randomized to was not a significant predictor of children's post-test scores on expressive vocabulary. In terms of the effect size for Model 2 for the post-test scores of expressive vocabulary, the adjusted $R^2 = .64$ demonstrated that there was a large effect.

Table 33

Hierarchical Regression Analysis for the Post-Test Scores of the Head, Toes, Knees and Shoulders Task for All Three Schools without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	74.87	5.84	< .001	4.70	7.07	.51	4.42	7.66	.56
Gender	18.98	6.83	.01	8.65	4.60	.06	8.71	4.59	.06
EAL Status	-17.64	6.84	.01	-.94	5.26	.86	-2.51	5.44	.65
Pre-test PA				.18	.06	.003	.17	.06	.01
Pre-test EV				.11	.07	.10	.12	.07	.09
Pre-test HTKS				.59	.06	< .001	.58	.06	< .001
Art							7.12	5.54	.20
TC							-.98	5.64	.86
R^2		.09			.62***			.62	
Adjusted R^2		.08			.60			.61	
F		7.66			46.88			33.91	
ΔR^2					.53			0.00	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 34

Hierarchical Regression Analysis for the Post-Test Scores of Phonological Awareness for All Three Schools without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	74.71	5.98	< .001	8.31	7.88	.29	18.55	8.28	.03
Gender	14.10	6.99	.05	3.83	5.13	.46	3.38	4.97	.50
EAL Status	-12.12	7.01	.09	2.31	5.87	.70	-2.31	5.88	.70
Pre-Test PA				.54	.07	< .001	.55	.07	< .001
Pre-test EV				.09	.08	.25	.10	.08	.19
Pre-test HTKS				.22	.07	.003	.21	.07	.003
Art							-5.32	5.98	.38
TC							-20.43	6.10	< .001
R^2		.05			.52***			.56**	
Adjusted R^2		.04			.51			.54	
F		3.76			31.89			25.99	
ΔR^2					.47			.04	

Note. $^{**}p < .01$, $^{***}p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 35

Hierarchical Regression Analysis for the Post-Test Scores of Expressive Vocabulary for All Three Schools without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	87.12	5.06	< .001	23.42	6.73	.001	23.21	7.32	.002
Gender	19.29	5.91	.001	7.64	4.38	.08	7.69	4.39	.08
EAL Status	-44.38	5.92	< .001	-14.97	5.02	.003	-16.18	5.20	.002
Pre-Test PA				.08	.06	.16	.07	.06	.22
Pre-test EV				.64	.07	< .001	.65	.07	< .001
Pre-test HTKS				.01	.07	.87	.01	.06	.90
Art							5.50	5.29	.30
TC							-.78	5.39	.89
R^2		.32			.65***			.66	
Adjusted R^2		.31			.64			.64	
F		35.02			54.68			39.17	
ΔR^2					.33			.01	

Note. **p* < .05, ***p* < .01, ****p* < .001

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted R^2 = .10, small effect size; Adjusted R^2 = .36, medium effect size; Adjusted R^2 = .51, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

The results of the hierarchical regression analysis for all three schools with age are outlined in Tables 36-38. For the hierarchical regression analysis of the post-test scores of the Head, Toes, Knees and Shoulders Task with age (Table 36), Model 2 was the best fitting model with the pre-test scores on phonological awareness ($\beta = .18$, $p = .003$) and pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .55$, $p < .001$) found to be significant predictors. The group the children were randomized to was not a significant predictor of children's post-test scores on the Head, Toes, Knees and Shoulders Task. In terms of the effect size for Model 2 for the post-test scores of the Head, Toes, Knees and Shoulders Task, the adjusted $R^2 = .61$ demonstrated that there was a large effect.

For the hierarchical regression analysis of the post-test scores of phonological awareness with age (Table 37), Model 3 was the best fitting model with the pre-test scores on phonological awareness ($\beta = .54$, $p < .001$) and pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .17$, $p = .02$) found to be significant predictors. Additionally, the group into which the children were randomized was a significant predictor of children's post-test scores of phonological awareness as children in the guided play group outperformed the children in the typical curriculum group ($\beta = -21.03$, $p < .001$). In terms of the effect size for Model 3 for the post-test scores of phonological awareness, the adjusted $R^2 = .54$ demonstrated that there was a large effect.

For the hierarchical regression analysis of the post-test scores of expressive vocabulary with age (Table 38), Model 2 was the best fitting model with EAL status ($\beta = -15.01$, $p = .003$) and pre-test scores on expressive vocabulary ($\beta = .64$, $p < .001$) found to be significant predictors. Native English speakers outperformed children with EAL on their post-test scores of expressive vocabulary. The group that the children were randomized to was not a significant predictor of children's post-test scores on expressive vocabulary. In terms of the effect size for Model 2 for the post-test scores of expressive vocabulary, the adjusted $R^2 = .64$ demonstrated that there was a large effect.

Table 36

Hierarchical Regression Analysis for the Post-Test Scores of the Head, Toes, Knees and Shoulders Task for All Three Schools with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-240.67	53.23	< .001	-62.46	41.76	.14	-68.62	41.79	.10
Age	4.96	.83	< .001	1.12	.69	.11	1.23	.69	.08
Gender	15.43	6.17	.01	8.47	4.57	.07	8.49	4.56	.06
EAL Status	-13.75	6.20	.03	-1.08	5.24	.84	-2.91	5.41	.59
Pre-test PA				.18	.06	.003	.16	.06	.01
Pre-test EV				.11	.07	.12	.11	.07	.11
Pre-test HTKS				.55	.07	< .001	.54	.07	< .001
Art							7.46	5.50	.18
TC							-1.72	5.61	.76
R^2		.27			.62***			.63	
Adjusted R^2		.26			.61			.61	
F		18.13			39.95			30.52	
ΔR^2					.35			0.00	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 37

Hierarchical Regression Analysis for the Post-Test Scores of Phonological Awareness for All Three Schools with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-162.51	57.47	.01	-37.23	48.86	.43	-40.94	45.41	.37
Age	3.73	.90	< .001	.13	.09	.19	1.00	.75	.18
Gender	11.43	6.67	.09	3.70	5.13	.47	3.21	4.96	.52
EAL Status	-9.20	6.69	.17	2.21	5.87	.71	-2.64	5.87	.65
Pre-Test PA				.54	.07	< .001	.54	.07	< .001
Pre-test EV				.09	.08	.28	.10	.08	.22
Pre-test HTKS				.19	.08	.01	.17	.07	.02
Art							-5.05	5.97	.40
TC							-21.03	6.10	< .001
R^2		.15			.53***			.57**	
Adjusted R^2		.13			.51			.54	
F		8.52			26.73			23.09	
ΔR^2					.38			.04	

Note. **$p < .01$, ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 38

Hierarchical Regression Analysis for the Post-Test Scores of Expressive Vocabulary for All Three Schools with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-63.54	49.81	.20	4.35	40.12	.91	-.18	40.32	.10
Age	2.37	.78	.003	.32	.66	.63	.39	.67	.56
Gender	17.59	5.78	.003	7.59	4.39	.09	7.62	4.40	.09
EAL Status	-42.53	5.80	< .001	-15.01	5.03	.003	-16.31	5.21	.002
Pre-Test PA				.08	.06	.17	.07	.06	.24
Pre-test EV				.64	.07	< .001	.64	.07	< .001
Pre-test HTKS				-.001	.07	.98	-.01	.07	.92
Art							5.61	5.30	.29
TC							-1.01	5.41	.85
R^2		.36			.65***			.66	
Adjusted R^2		.35			.64			.64	
F		27.73			45.37			34.16	
ΔR^2					.29			.01	

Note. *$p < .05$, **$p < .01$, ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

5.3 Discussion

5.3.1 Key contributions of the relationship between children's self-regulation, and language skills upon entry into reception. There were low positive correlations between the three self-regulation measures – the Statue Task; the Head, Toes, Knees and Shoulders Task; and the Gift Delay Task. Interestingly at baseline as children's age and expressive vocabulary scores increased, their scores on the Head, Toes, Knees and Shoulders Task and phonological awareness increased. Similarly, in line with my hypothesis, gender and EAL status were significant predictors of children's expressive vocabulary scores at baseline with females and native English speakers having higher expressive vocabulary scores.

5.3.2 Key contributions of the efficacy of using a guided play intervention with elements of pretense on the self-regulation, and language skills of 4- to 5-year-olds with EAL. The group into which the children were randomized to (guided play, art activities or typical curriculum) was a significant predictor of children's post-test phonological awareness scores, with children in the guided play group having significantly higher post-test phonological awareness scores than children who were exposed to typical curriculum.

5.3.3 The relationship between children's self-regulation, and language skills upon entry into reception. The upcoming subsections will discuss the findings of the Spearman's correlation between the three self-regulation measures (the Statue Task; the Head, Toes, Knees and Shoulders Task; and the Gift Delay Task), and the path analysis of the children's scores on the Head, Toes, Knees and Shoulders Task; phonological awareness; and expressive vocabulary at baseline.

5.3.3.1 Not all self-regulation measures were correlated. The Statue Task; the Head, Toes, Knees and Shoulders Task; and the Gift Delay Task have been used in previous studies to assess children's self-regulation skills. In my study there were only significant correlations between the Statue Task and the Head, Toes, Knees and Shoulders Task; and the Head, Toes, Knees and Shoulders Task and the Gift Delay Task. There was a non-significant correlation between the Statue Task and the Gift Delay Task. In terms of effect sizes, based on Cohen's guidelines (Hemphill, 2003) there is a small association between the Statue Task and the Head, Toes, Knees and Shoulders Task; and the Head, Toes, Knees and Shoulders Task and the Gift Delay Task. A possible explanation is that the Head, Toes, Knees and Shoulders Task was the most physical task whereas both the Statue Task and the Gift Delay Task had a larger language component.

Previous work on young children's language and self-regulation skills highlights that language influences the development of children's self-regulation skills (Kuhn et al., 2014; Santa-cruz & Rosas, 2017). Zelazo and Frye (1998) suggest that children's language skills are a critical precursor to the development of their executive function skills including self-regulation. Zelazo and Frye hypothesize that this development of children's executive function skills occurs as children are able to form a mental representation of the problem they are experiencing, and they utilize their language skills to construct and use the embedded rule structures to find a solution to the problem. Marcovitch and Zelazo (2009) expands on this hypothesis by referring to the hierarchical competing systems model which states that children's initial cognitive processes are formed based on the *habit system* which depends on their experiences as infants. However, as children age, their cognitive processes transform into a *representational system* during which language plays a significant role as the strength of the representation increases if children are able to label it and consciously reflect on behaviour (Kuhn et al., 2014). Kuhn et al. add that as children's language skills develop, they are able to organize symbols in a hierarchical manner and by having more experience with these rules, largely due to the increased use of language, children may have a greater ability to organize information. Consequently, given that the children in my study were in the first year of school and there were large numbers of children with EAL, the low significant positive correlations might have resulted from variations in children's language skills. For instance, at baseline, native English speakers had higher scores on average on the Head, Toes, Knees and Shoulders Task compared to children with EAL, and children with EAL had higher scores on average on the Gift Delay Task compared to their native English-speaking peers.

An alternate explanation is that out of the three tasks, the Head, Toes, Knees and Shoulders Task was the only task that included a practice component during which the assessor modelled the correct response and the children were able to receive corrective feedback. Schunk and Zimmerman (2007) suggest that the use of modeling and the provision of feedback can be effective strategies for improving children's self-regulation skills, and it provides an opportunity to clarify children's misunderstandings regarding the instructions of the task. When children observe a competent model, such as the researcher modeling the correct response, it provides them with information about the sequence of actions they are to use to be successful. This concept was expanded on by Schunk and Zimmerman (1998) who posited that self-regulation involves three phases: (i) forethought; (ii) performance control; and (iii) self-reflection. More so modeling has particular influence in the forethought stage as it sets the person up to be successful in the following stages. In the study by Schunk and

Zimmerman, children were able to use modeling to come up with an effective strategy for developing their self-regulation skills. Consequently, in my study the practice or lack thereof, as in the case of the Statue Task and the Gift Delay Task, could have influenced children's performance on all three measures.

Hence to account for the variations in children's language skills and for the potential benefits of a practice session, for the remainder of the analysis of the study the Head, Toes, Knees and Shoulders Task will be used over the Statue Task and the Gift Delay Task. Additionally, while administering the three self-regulation tasks to the children (the Statue Task; the Head, Toes, Knees and Shoulders Task; and the Gift Delay Task) I noticed that children were better able to resolve their misconceptions with the Head, Toes, Knees and Shoulders Task as they frequently self-corrected their initial response rapidly and quite often repeated the instructions of the task orally while completing the task.

5.3.3.2 Older children, girls, and native English speakers had higher scores at baseline subject to the dependent variable. The conflicting results of the fit of my model may be attributed to the small sample size. Therefore, when examining the predictors of the variables as indicated by both my models (without and with age), the small sample size needs to be taken into consideration. For both the models without and with age, the study indicates that as children's age and expressive vocabulary scores increase, their scores on the Head, Toes, Knees and Shoulders Task and phonological awareness increase. With respect to age, these results are aligned with that of the findings of the studies by Elias and Berk (2002) and Chipere (2014). Elias and Berk explain that as children age they gradually improve their self-regulation skills and Chipere highlights that possibly as children get older, they develop their phonological awareness skills due to the effects of both natural phonological development and explicit instruction in school.

In terms of effect size, there was a medium effect for age and a small effect for expressive vocabulary on the children's pre-test scores of the Head, Toes, Knees and Shoulders Task for the model with age. Additionally, there was a small effect for age and a medium effect for expressive vocabulary on children's phonological awareness scores at baseline. The only difference between the output models without and with age was that when age was not included in the model, there was a medium effect size for pre-test scores on expressive vocabulary predicting children's pre-test scores on the Head, Toes, Knees and Shoulders Task. However, when age was included in the model, there was a small effect for expressive vocabulary on the children's pre-test scores of the Head, Toes, Knees and

Shoulders Task. Contrary to the findings of Bohlmann et al. (2015), age was not a significant predictor of children's expressive vocabulary at baseline in both models. In the study by Bohlmann and colleagues, there was a small effect of age on children's expressive vocabulary scores when children would have been in reception. The difference in the findings between my study and that of Bohlmann et al. could be due to the difference in the measures used in both studies. In the case of Bohlmann et al.'s study, the expressive vocabulary skills of children with EAL were assessed in English using the Woodcock–Johnson III Tests of Achievement (Mather, Wendling, & Woodcock, 2001) and in Spanish using the Bateria III Woodcock– Munoz; Vocabulario sobre dibujos subtest (Wechsler et al., 2010). However, in my study the children's expressive vocabulary skills were only assessed in English regardless of the children's EAL status. Additionally, the ethnicity of the participants differed across both studies.

Interestingly, children's expressive vocabulary skills significantly predicted children's scores on the Head, Toes, Knees and Shoulders Task at baseline in both models, but this relationship was unidirectional as the children's score on the Head, Toes, Knees and Shoulders Task were not a significant predictor of expressive vocabulary skills. In terms of effect size, there was a small effect for expressive vocabulary on the pre-test scores of the Head, Toes, Knees and Shoulders Task. This finding is contrary to that of Bohlmann et al. (2015) who noted a bidirectionality between expressive vocabulary and self-regulation skills among native English-speaking preschoolers and their peers with EAL. The difference could possibly be due to Bohlmann et al.'s use of the Pencil Tap (Blair, 2002; Diamond & Taylor, 1996) and the Toy Sort tasks (Brock et al., 2009) to measure children's self-regulation skills, and the diversity of the sample in my study and that of Bohlmann et al.'s differed. More research is needed in this area with a much larger sample size than that included in my study.

In terms of the role of gender, here the results indicated that gender was a significant predictor of children's expressive vocabulary skills at baseline in both models where girls outperformed the boys with a small effect size. This finding is aligned with the study by Chipere (2014) as on average there was a significant difference between the means of the children's expressive vocabulary scores by gender where on average girls had higher expressive vocabulary scores at baseline than the boys. Sherman (1967) supports this finding and suggests that in early childhood girls tend to have slightly better verbal abilities than boys possibly due to biological or sociological reason. However, similar to the results of Chipere's study gender was not a significant predictor of children's phonological awareness skills when children were in reception class but was only a significant predictor when children were in the

second grade. This finding is aligned with Sherman's article that suggests that as children get older and due to the practice effect and the social pressure for young children to adopt gender-based identities, girls develop better language skills than boys, but boys tend to have better spatial skills than girls. There was no significant difference between the means of girls' and boys' phonological awareness skills at baseline by gender. Gender was also a non-significant predictor of children's pre-test scores on the Head, Toes, Knees and Shoulders Task. Grissom and Reyes (2019) highlight that there are no gender differences in impulsive control amongst humans. However, there are gender differences in response to task difficulty or environmental factors with females being affected by task difficulty to a greater degree than males, and males being affected by perturbations in the environment to a greater degree than females.

Lastly, in terms of EAL status the findings in both models align with that of Carlson and Meltzoff (2008) as EAL status was a significant predictor of children's expressive vocabulary skills at baseline to a medium effect. Gámez et al. (2019) elaborate that dual language learners tend to have lower expressive vocabulary skills but their gain in expressive vocabulary skills may be influenced by the frequency of their interactions with native English-speaking peers who typically use higher quality language and diverse vocabulary. There was a significant difference in the means of the expressive vocabulary scores by EAL status as native English speakers had higher expressive vocabulary scores than children with EAL.

To sum up the relationship between children's self-regulation and language skills upon entry into reception based on both models, as children's age and expressive vocabulary skills increase, their scores on the Head, Toes, Knees and Shoulders Task and phonological awareness increase. Additionally, girls and native English speakers outperform the boys and children with EAL on their expressive vocabulary skills.

5.3.4 The guided play intervention was efficacious for children's post-test scores on phonological awareness. The results of the hierarchical regression models were the same without and with age added to the model. The results demonstrated that the group the children were randomized into was only a significant predictor in connection with children's phonological awareness skills. For the best-fitting model for the children's post-test scores on Head, Toes, Knees and Shoulders Task both without and with age, the children's pretest scores for phonological awareness have shown to be significant predictors of children's post-test scores on the Head, Toes, Knees and Shoulders Task. This finding is supported by Ertmer and Ertmer (2014) as children's phonology skills are influenced by environmental and within-

child factors, the latter of which includes children's self-regulation skills. Consequently, Ertmer and Ertmer suggest the use of self-regulated learning strategies when working with children who have trouble with their phonological skills so as to allow for development in this area. Children's pre-test scores on the Head, Toes, Knees and Shoulders Task itself were also a significant predictor of their post-test scores on the same task, which is to be expected. There was no significant change in the variance when the group that the children were randomized to was added to the model. This result was contrary to findings of the study by Carlson & Meltzoff (2008) that demonstrated that there was a medium effect size for the relation between pretend play and children's self-regulation skills. This finding differed for my study but Carlson, White, and Davis-Unger (2014) highlight that only a few studies have supported the theoretical claim of the role of pretend play in the development of children's self-regulation skills. In terms of the effect size, there was a large effect for the best fitting model for the children's post-test scores on Head, Toes, Knees and Shoulders Task.

In the case of the children's phonological awareness skills, the best fitting model of the children's post-test phonological awareness scores both without and with age suggest that children's pre-test scores on the Head, Toes, Knees and Shoulders Task are significant predictors of children's post-test phonological awareness scores. Ertmer and Ertmer (2014) highlight the relationship between children's development of phonological awareness and self-regulation skills which supports this finding. Children with higher self-regulation skills are able to use and alter their learning habits through behavioral, metacognitive, and motivational strategies by combining their own learning strengths and weaknesses so that it complements the task's requirements and drawing upon learning strategies that have previously been successful to complete the task effectively. My findings also note that as expected children's pre-test scores of phonological awareness significantly predicts their post-test scores on the same measure. Interestingly, there was a significant change in the variance when the group that the children were randomized to was added to the model both without and with age as the study demonstrated that participation in the guided play intervention was beneficial to the development of children's phonological awareness skills. In particular, children in the guided play group had higher post-test phonological awareness scores than children who were exposed to typical curriculum.

There have been studies that have examined children's phonological awareness development between native English speakers and their EAL peers. However, as far as I am aware, there are a lack of studies that identify the role of pretend play with a guided approach in children's phonological awareness development. That being said all of the four storybooks

that were used in my study were picture books and Strasser and Seplocha (2007) suggest that engaging the children in picture books allows for the development of their phonological awareness skills. Consequently, perhaps the shared storybook reading component of the intervention supported the development of the children's phonological awareness skills that the children in the typical curriculum group were not exposed to. The findings of my study suggest more work needs to be done in this area given the importance of children's phonological awareness skills towards the foundation of children's reading comprehension skills (Pullen & Justice, 2003). In terms of the effect size, there was a large effect for the best fitting model for the children's post-test scores on phonological awareness as a greater portion of the variance was explained when the group that the children were randomized to was added to the model.

With regards to the children's post-test scores for expressive vocabulary, there was a positive association between EAL status and children's post-test expressive vocabulary scores as native English speakers had higher post-test expressive vocabulary scores than their peers for both models without and with age. This finding is aligned with the findings of Carlson and Meltzoff (2008) who highlight that bilingual children had significantly lower scores than that of their monolingual peers. In my study, the difference in expressive vocabulary scores was sustained over the duration of the intervention as there was a significant difference in the means of the expressive vocabulary scores at baseline by EAL status with native English speakers having greater expressive vocabulary scores than children with EAL in both models without and with age. In addition, as expected, children's pre-test scores for expressive vocabulary were significant predictors of their post-test scores in both models without and with age. There was no significant change in the variance when the group that the children were randomized to was added to both models without and with age. This result differs from the findings of the study by Han et al. (2010) and children in the shortened Explicit Instructional Vocabulary Protocol and play session group experienced greater gain in their expressive vocabulary skills than that of their peers who only received exposure to the Explicit Instructional Vocabulary Protocol without the play session. Alternatively, the play component that Han et al. used did not involve roleplay such as in my study and it is worth considering whether the type of play influences the development of children's explicit vocabulary skills.

5.4 Conclusions

There were low positive correlations between the three self-regulation measures – the Statue Task, the Head, Toes, Knees and Shoulders Task, and the Gift Delay Task – possibly due to the variations in children's language skills and the potential benefits of a practice component as included in the Head, Toes, Knees, and Shoulders Task. In terms of the children's self-regulation and language skills upon entry into reception, as children's age and expressive vocabulary scores increased, their scores on the Head, Toes, Knees and Shoulders Task and phonological awareness increased. Additionally, girls and native English speakers had higher expressive vocabulary scores at baseline than boys and children with EAL. In connection with the efficacy of the guided play intervention, my study indicates that the intervention was efficacious at the group level in connection with children's post-test scores on phonological awareness.

There were a few limitations in the analysis of the data that was collected from all three schools. First, given the lack of responses to the parental questionnaire, I did not have information on the family's SES, age of the parents, family composition, languages spoken at home, parents' level of education and employment status, parents' marital status, ethnicity, frequency of home reading, length of stay in the UK, and prior childcare experience and as such could not include these variables in the analysis. These variables particularly languages of exposure, onset of exposure, amount of exposure and SES have been shown to influence the development of children's language skills. Byers-Heinlein et al. (n.d) designed MAPLE, a Multilingual Approach to Parent Language Estimates, which consists of an approximately 15-minute structured interview to quantify children's language exposure. The measure takes into account five key descriptors: languages of exposure, community context, onset of exposure, amount of exposure, and SES.

Another limitation is that since the study's sample ($N = 151$) came from three schools, six classrooms, and were randomized into three groups (guided play, art activities, and typical curriculum), there was insufficient power to examine the effects of the intervention at the school and classroom level. Moreover, due to the misunderstanding of the teachers in School I, I was unable to examine the children's pre-literacy skills and the data from the teacher evaluations across all three schools. Furthermore, other studies have demonstrated the link between children's self-regulation, language and working memory skills (Abu-Rabia & Siegel, 2002; Ardila, 2003; Carlson et al., 2002; Da Fontoura & Siegel, 1995; Lesaux & Siegel, 2003) but I was only able to collect data on children's working memory skills in

Schools II and III as this measure was added to the study upon completion of data collection in School I.

The findings from the analysis of the data from all three schools suggests the need for further research in the area of guided pretend play and children's self-regulation and language skills especially with 4- and 5-year-olds from low-income households and diverse backgrounds. Given the influence of family's SES, parents' level of education, and the language environment on children's language development, it would be beneficial if further research examined the influence of these variables on children's self-regulation and language development.

The next chapter will analyze the data that were collected from Schools II and III which included measures of children's working memory and pre-literacy skills and teacher evaluations that were not analyzed in School I. Accordingly, I will examine the relationship between children's self-regulation, language, working memory, and pre-literacy skills upon entry into reception in the next chapter. Additionally, I will examine the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, working memory, and pre-literacy skills of 4- to 5-year-olds with EAL.

Chapter Six

Analysis Two – Children's Self-Regulation, Language Skills, Working Memory, and Pre-Literacy Skills

In this chapter, I will analyze data Schools II and III only. The resulting sample includes 98 children unlike the previous chapter that included 151 children from all three schools. I include this chapter to provide an exploratory analysis because given my small sample size, I do not have the statistical power to run the path analysis that I will be carrying out. That being said, I analyze children's pre- and post-test scores of working memory and pre-literacy that were not included in the previous chapter. Given the importance of working memory and pre-literacy development in children's early years (Carlson & Meltzoff, 2008; Carlson et al., 2014) combined with the lack of research that involves children from diverse backgrounds and those who come from low-income households, it is imperative for the exploratory analysis to be carried out so as to support further research in this area. Parts of this chapter closely match the previous one. The repetition is for clarity and allows each chapter to be read in isolation.

There are no existing studies which have examined children's self-regulation, language, working memory, and pre-literacy skills in tandem. Children have a wide variation in their self-regulation skills in early childhood. These skills have been shown to predict their school readiness and academic achievement in the short- and long-term (McClelland et al., 2012). Moreover, children's development of self-regulation skills is affected by their language skills. Children who begin the first years of schooling with lower vocabulary skills than that of their peers are at risk of reading problems in the later years (McLeod et al., 2017). Children from low-income households are particularly at risk of experiencing language and reading delays as a result of parental education, income and involvement that have been shown to influence general academic outcomes. Previous studies have also suggested that language production in turn supports the enhancement of children's working memory skills as well (Carlson & Meltzoff, 2008; Hassinger-Das et al., 2017).

This chapter addresses three research questions: (1) What is the relationship between children's self-regulation, language, working memory, and pre-literacy skills upon entry into reception? (2) What is the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, working memory, and pre-literacy skills of 4- to 5-year-olds with EAL? and (3) What is the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive

vocabulary skills? The chapter is divided into four sections: (1) method; (2) results; (3) discussion; and (4) conclusion.

6.1 Method

6.1.1 Participants. The sample (N = 98) consisted of 48 boys, 32 children with EAL (M_{age} = 63.33 months, SD_{age} = 3.90 months). There were 26 children in the guided play group (13 boys, 8 children with EAL, all children were randomly assigned to the group). There were 23 children in the art activities group (11 boys, 12 children with EAL, all children were randomly assigned to the group). There were 49 children in the typical curriculum group (25 boys, 12 children with EAL, all children were randomly assigned to the group). Sixteen children were excluded from the study: five parents opted for their children not to participate in the study, two children were non-verbal, four children left the schools, one child had a developmental delay, two children had behavioral problems, one child was epileptic, one child was diagnosed with a speech language impairment, and one child was hearing impaired. There were one class of students from School II, and three classes of students from School III that were included in the study.

6.1.2 Design and Procedures. In groups of five or six, the children received sixteen 30-minutes sessions of the intervention. The intervention was based on three components: (1) shared storybook reading; (2) roleplaying or participating in art activities; and (3) review (Table 4 on page 44). The children were read four storybooks over the duration of the intervention and each storybook was repeated four times. The children received explicit phonological awareness and expressive vocabulary instruction for 72 words in total, 18 words per book. The random allocation to the experimental (guided play intervention) or active control group (art activities) was conducted using the class lists. A third passive control group (typical curriculum) was also included in the study. Table 39 outlines the breakdown of the groups across the three schools.

Table 39

Groups from Schools II and III

School II	School III
Experimental Group – Guided Play Group	Experimental Group – Guided Play Group
Active Control Group – Art Activities Group	Active Control Group – Art Activities Group
	Passive Control Group – Typical Curriculum

To comply with the time constraints of the academic year and the numbers of students within the schools, Schools II included two groups: (1) the experimental group – guided play; and (2) the active control group – art activities. School III included all three groups: (1) the experimental group – guided play; (2) the active control group – art activities; and (3) the passive control group – typical curriculum. Another aspect that differed between the three schools was the time that it took for the administration of the sixteen sessions of the intervention. It took 16 weeks to administer the sessions in School II, and 15 weeks to carry out the sessions in School III. This variation was the result of the scheduling needs of each school.

6.1.3 Materials. Table 40 notes the measures that were analyzed across Schools II and III. Kindly refer to Section 3.10 on pp. 50-53 for a description of all the measures used and their scoring in the study.

Table 40

Measures that were analyzed in Schools II and III

Type of measure	Purpose of assessment	Measure
Child	Self-regulation	• HTKS task
	Phonological awareness in English	• Phonological Awareness subtest of the CELF-P2
	Expressive vocabulary in English	• Expressive vocabulary subtest of the CELF-P2
	Working Memory	• Spin the Pots Task
Teacher	Pre-literacy in English	• Pre-Literacy Rating Scale of the CELF-P2
	Teacher Evaluation	• Teacher evaluation adapted from that utilized in the 'HK-UK Family Thinking Skills Study'

Abbreviation: HTKS, Head, Toes, Knees and Shoulders Task.

6.1.4 Data processing and analysis. The data on all measures were collected on-site at both schools at two time points: (1) before the intervention was carried out; and (2) following the completion of the 16 sessions of the intervention. All of the data were managed in SPSS and were analyzed using R. The raw data were used for all of the analysis as per the recommendations of the Education Endowment Foundation (2015). In terms of missing data, the missing observations resulted from children being absent on the day of data collection. This is assumed to be random. Linear regression was used to impute the missing values based on known predictors of the missing variable. Using an iterative process, the regression equation was calculated using cases where the complete data for the predictor variables were available. In terms of the pre-test scores, there were three missing values for the Head, Toes, Knees and Shoulders Task, three missing values for expressive vocabulary, and four missing values for pre-literacy. In terms of the post-test scores, there were two missing values for the Head, Toes, Knees and Shoulders Task, two missing values for expressive vocabulary, five missing values for phonological awareness, and five missing values for working memory. The regression equations that were used for the missing data are shown in Table 41.

Table 41

Regression Equations for Missing Data for Schools II and III

Measure	Equation
Pre-test scores on the HTKS Task	Pre-test scores on the HTKS Task = -101 + 1.89(Age)
Post-test scores on the HTKS Task	Post-test scores on the HTKS Task = -32 + .21(Age) + .69(Pre-test scores on the HTKS Task)
Pre-test scores on EV	Pre-test scores on EV = 3 + .14(Age) + .23(Pre-test scores on the HTKS Task)
Post-test scores on EV	Post-test scores on EV = 2 + .09(Age) + .77(Pre-test scores on EV) - .005(Pre-test scores on the HTKS Task)
Post-test scores on PA	Post-test scores on PA = -8 +.27(Age) + .51(Pre-test scores on PA)
Pre-test scores on PL	Pre-test scores on PL = -39 + 1.97(Age)
Post-test scores on WM	Post-test scores on WM = .2 + .002(Age) + .001(Pre-test scores on the HTKS Task) + .21(Pre-test scores on WM)
Post-test scores on PL	Post-test scores on PL = 29 +.45(Age) +.43(Pre-test scores on PL)

Abbreviations: HTKS, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness; PL, pre-literacy; WM, working memory.

With regards to the first research question about *the relationship between children's self-regulation, language, working memory, and pre-literacy skills upon entry into reception*, there were three steps in the data analysis process: (1) T-tests for examining the effects of gender and EAL status; (2) Simple Linear Regression analysis for examining the effect of age; (3) Path analysis of the children's scores on the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy. First, the t-tests were conducted to examine if there was a significant difference between the means at baseline with regards to gender and EAL status for the pre-test scores on the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy. Then, simple linear regression analysis was done to show the relationship between the children's age in months and their pre-test scores on the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy. Table 42 and Table 44 has the descriptive statistics of the pre-test and post-test scores respectively for the measures analyzed from Schools II and III. Tables 43 and 45 have the descriptive statistics of the pre-test and post-test scores by group respectively

for the measures analyzed from Schools II and III. Lastly, path analysis was used to provide estimates of the magnitude and significance of the hypothesized relations between the children's age; gender; EAL status; the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy at baseline. Two models of the path analysis were carried out: (i) One model without children's age in accordance with Vygotskian theory; and (ii) One model with children's age to examine the relations between age; the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy. The second model with age was run due to reliable differences across age within the same year. Since the pre-test scores of the measures were not-normally distributed (Table 42), ranking was used to transform the data whereby the numerical values were replaced by their rank to carry out the path analysis. Figures 5 and 6 show the input model of the path analysis for the data from Schools II and III without age and with age respectively.

Table 42

Descriptive Statistics of Pre-Test Scores for Schools II and III

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Pre-Test HTKS	98	0	56	20.26	17.46	.27 (.24)	-1.26 (.48)
Pre-Test PA	98	0	22	8.59	5.79	.23 (.24)	-.78 (.48)
Pre-Test EV	98	2	36	17.24	8.38	.05 (.24)	-.68 (.48)
Pre-Test WM	98	.25	.91	.47	.10	1.55 (.24)	3.66 (.48)
Pre-Test PL	98	37	104	84.22	17.16	-.69 (.24)	-.48 (.48)

Abbreviations: HTKS, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 43

Descriptive Statistics of Pre-Test Scores for Schools II and III by Group

Group		*n*	Min	Max	*M*	*SD*	Skewness	Kurtosis
Play	Pre-Test HTKS	26	0	47	19.62	15.51	.12 (.46)	-1.55 (.89)
Art	Pre-Test HTKS	23	0	56	19.09	16.57	.63 (.48)	-.52 (.94)
TC	Pre-Test HTKS	49	0	56	21.14	18.62	.19 (.34)	-1.41 (.67)
Play	Pre-Test PA	26	0	20	7.77	5.37	.16 (.46)	-.48 (.89)
Art	Pre-Test PA	23	0	19	8.30	5.35	.65 (.48)	-.44 (.94)
TC	Pre-Test PA	49	0	22	9.16	6.23	.07 (.34)	-.95 (.67)
Play	Pre-Test EV	26	4	36	16.27	8.25	.45 (.46)	-1.55 (.89)
Art	Pre-Test EV	23	3	30	16.00	7.29	.11 (.48)	-.62 (.94)
TC	Pre-Test EV	49	2	36	18.35	8.93	-.22 (.34)	-.62 (.67)
Play	Pre-Test WM	26	.25	.71	.44	.09	.92 (.46)	1.89 (.89)
Art	Pre-Test WM	23	.35	.83	.47	.11	2.07 (.48)	4.43 (.94)
TC	Pre-Test WM	49	.35	.91	.49	.10	1.73 (.34)	4.78 (.67)
Play	Pre-Test PL	26	37	104	84.23	20.37	-.88 (.46)	-.41 (.89)
Art	Pre-Test PL	23	52	104	80.21	19.10	-.03 (.48)	-1.69 (.14)
TC	Pre-Test PL	49	52	104	86.10	14.16	-.86 (.34)	.57 (.67)

Abbreviations: TC, typical curriculum; HTKS, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 44

Descriptive Statistics of Post-Test Scores for Schools II and III

	n	Min	Max	*M*	*SD*	Skewness	Kurtosis
Post-Test HTKS	98	0	60	26.32	17.80	-.20 (.24)	-1.26 (.48)
Post-Test PA	98	0	23	13.99	5.34	-.63 (.24)	-.09 (.48)
Post-Test EV	98	2	37	21.31	7.87	-.38 (.24)	-.44 (.48)
Post-Test WM	98	.24	1	.51	.15	1.41 (.24)	1.75 (.48)
Post-Test PL	98	58	104	96.26	11.15	-1.78 (.24)	2.13 (.48)

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 45

Descriptive Statistics of Post-Test Scores for Schools II and III by Group

Group		*n*	Min	Max	*M*	*SD*	Skewness	Kurtosis
Play	Post-Test HTKS	26	0	60	22.38	19.34	.29 (.46)	-1.24 (.89)
Art	Post-Test HTKS	23	0	48	29.09	15.56	-.56 (.41)	-.81 (.94)
TC	Post-Test HTKS	49	0	58	27.10	17.95	-.31 (.34)	-1.25 (.67)
Play	Post-Test PA	26	3	22	15.04	5.19	-.92 (.46)	.30 (.89)
Art	Post-Test PA	23	4	23	14.65	5.25	-.37 (.48)	-.78 (.94)
TC	Post-Test PA	49	0	21	13.12	5.42	-.64 (.34)	.11 (.67)
Play	Post-Test EV	26	10	34	21.31	6.86	.19 (.46)	-.94 (.89)
Art	Post-Test EV	23	2	37	21.13	9.09	-.43 (.48)	-.57 (.94)
TC	Post-Test EV	49	4	36	21.39	7.92	-.54 (.34)	-.26 (.67)
Play	Post-Test WM	26	.24	1	.49	.15	1.84 (.46)	4.79 (.89)
Art	Post-Test WM	23	.35	.83	.49	.13	1.42 (.48)	1.40 (.94)
TC	Post-Test WM	49	.35	1.00	.53	.15	1.26 (.34)	.98 (.67)
Play	Post-Test PL	26	62	104	94.69	13.87	-1.33 (.46)	.17 (.87)
Art	Post-Test PL	23	58	104	97.57	11.22	-2.60 (.48)	7.07 (.94)
TC	Post-Test PL	49	72	104	96.47	9.55	-1.75 (.34)	1.96 (.67)

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

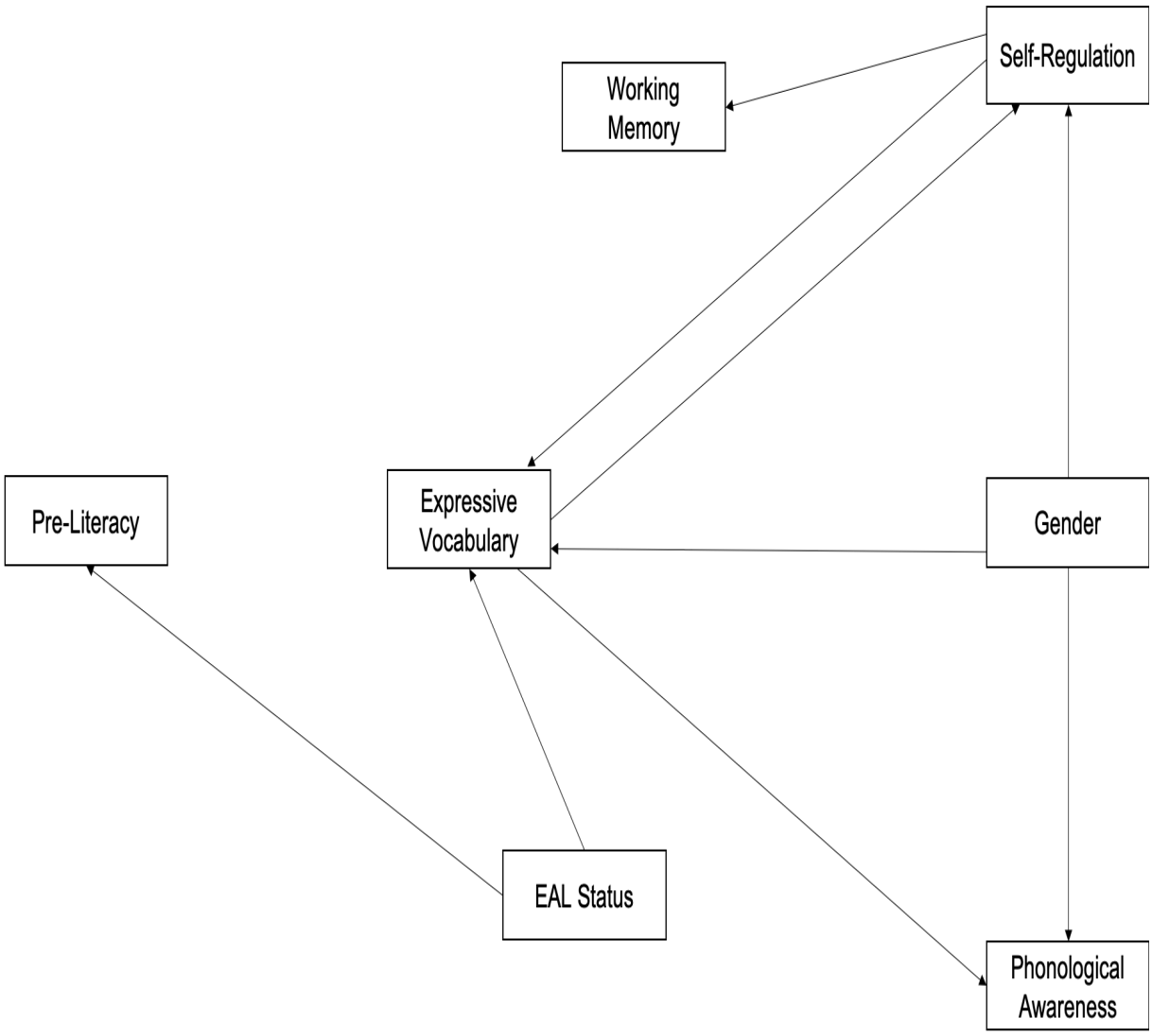

Figure 5. Input model of the path analysis for the data from Schools II and III without age.

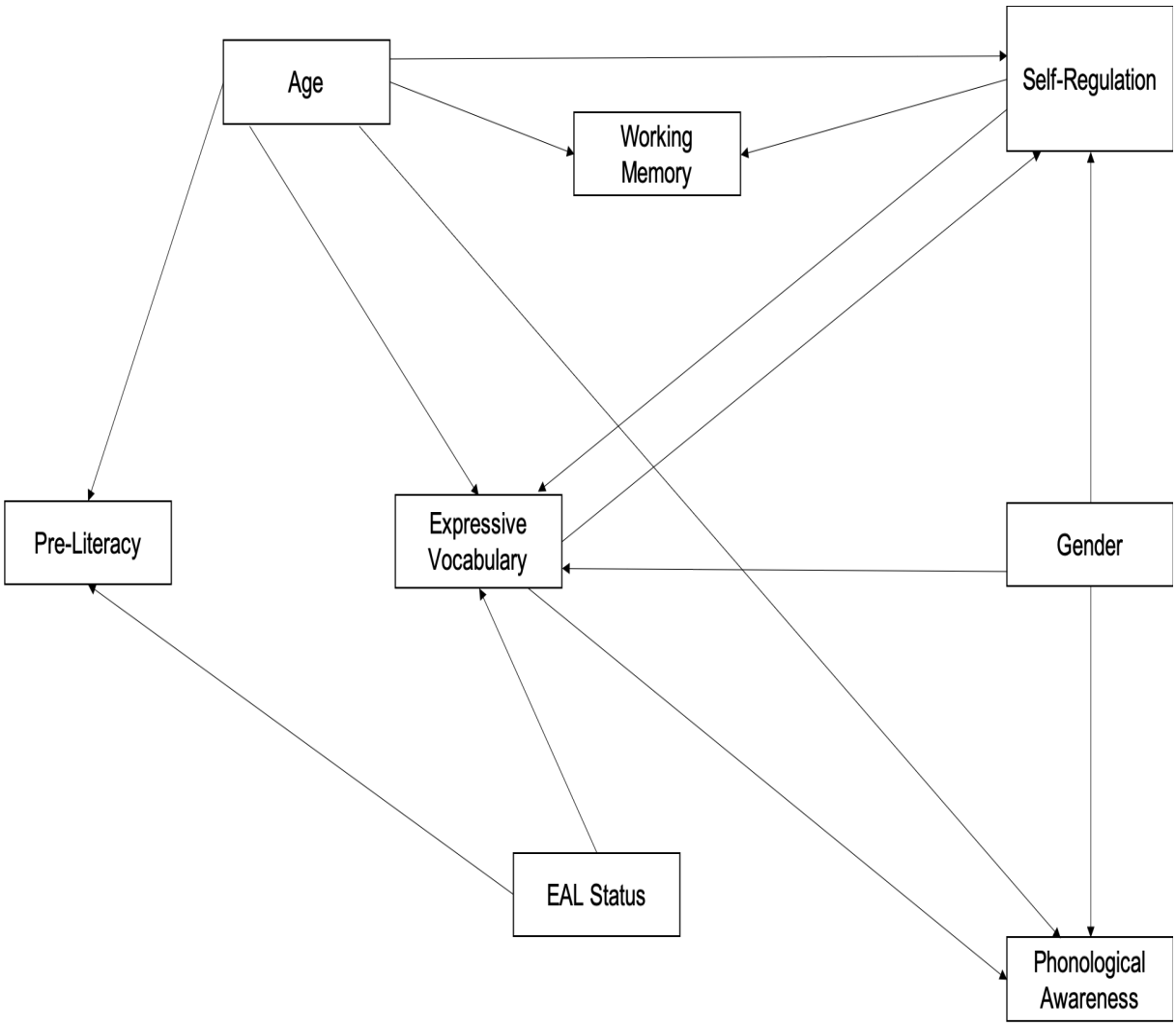

Figure 6. Input model of the path analysis for the data from Schools II and III with age.

The input models for the data from Schools II and III (Figures 5 and 6) were based on previous studies that have demonstrated the effect of age and gender on children's self-regulation, phonological awareness, and expressive vocabulary skills (Chipere, 2014; Elias & Berk, 2002; McDowell et al, 2007). Carlson et al. (2002) highlighted the relationship between age, and children's self-regulation and working memory skills. Bohlmann et al. (2015) outline the relationship between children's self-regulation and expressive vocabulary skills. Other studies have also demonstrated the influence of gender on children's self-regulation, phonological awareness, and expressive vocabulary skills (Chipere, 2014; Sherman, 1967). Carlson and Meltzoff (2008) and Gámez et al. (2019) focus on the effect of EAL status on children's expressive vocabulary skills. Lesaux and Siegel (2003) and Lonigan (2006) illustrated the relationship between EAL status and children's pre-literacy skills and age respectively.

Even though the path analysis was underpowered, I carried out the analysis because as far as I am aware there has not been a study with 4- and 5-year-olds from low-income households and those with EAL that has examined children's self-regulation, phonological awareness, expressive vocabulary, working memory, and pre-literacy skills in tandem. This gap is significant as children develop these skills rapidly during the preschool years (Cheng and Johnson, 2010; Lillard et al., 2013) and examining the relationship between these variables at baseline contributes to the knowledge base in this area with a diverse sample.

In terms of the second research question inquiring about the *efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, working memory, and pre-literacy skills of 4- to 5-year-olds with EAL,* hierarchical regression analysis was carried out on the children's post-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy skills. Hierarchical regression was used to examine how much variance of the children's post-test scores were accounted for by the children's age; gender; EAL status; pre-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy; and the group that the children were in (play, art activities, or typical curriculum). I chose to use hierarchical regression over running an ANOVA for my analysis as hierarchical regression allows for the examination of a large number of potential predictor variables and I aimed to identify which variables had the most predictive power. I incorporated three categorical predictors (gender, EAL status, and group that the children were randomized into) into the regression model by imputing k-1 indicator variables. The imputation was conducted as contrary to an ANOVA model, a regression model cannot be

conducted using categorical predictor variables. The hierarchical regression model effectively obtains the same results as an ANOVA model as there are lots of similarities in the procedures used to examine the underlying assumptions. Similar to the previous analysis, this analysis was critical given that it was the first time that my intervention was used in schools.

The hierarchical regression was carried out twice: (i) Once without children's age in accordance with Vygotskian theory; and (ii) Once with children's age to examine how much variance of the children's post-test scores were accounted for by the age. The second model with age was run due to reliable differences across age within the same year. Since the pre-test scores of the measures were not-normally distributed (Table 41), ranking was used to transform the data whereby the numerical values were replaced by their rank to run the hierarchical regression. I used three models in the hierarchical regression analysis for all of the post-test measures as outlined in Tables 46 and 47.

Table 46

Models used in the Hierarchical Regression Analysis for Data from Schools II and III without Age

Model	Equation
1	Post-test scores on the tasks = Intercept + Gender + EAL Status
2	Post-test scores on the tasks = Intercept + Gender + EAL Status + Pre-test scores of the HTKS Task + Pre-test scores of PA + Pre-test scores of EV + Pre-test scores of WM + Pre-test scores of PL
3	Post-test scores on the tasks = Intercept + Gender + EAL Status + Pre-test scores of the HTKS + Pre-test scores of PA + Pre-test scores of EV + Pre-test scores of WM + Pre-test scores of PL + Group

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 47

Models used in the Hierarchical Regression Analysis for Data from Schools II and III with Age

Model	Equation
1	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status
2	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status + Pre-test scores of the HTKS Task + Pre-test scores of PA + Pre-test scores of EV + Pre-test scores of WM + Pre-test scores of PL
3	Post-test scores on the tasks = Intercept + Age + Gender + EAL Status + Pre-test scores of the HTKS + Pre-test scores of PA + Pre-test scores of EV + Pre-test scores of WM + Pre-test scores of PL + Group

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

To address the third research question about the *correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills*, I examined the strength and direction of the association. This analysis was important as there is limited research on the corroboration of results of teacher reports and direct measures of children's skills in these areas particularly with respect to children with EAL from low-income households. The Head, Toes, Knees and Shoulders Task was used as a measure of self-regulation in the analysis. The study sought to contribute to the evidence base in this area. Given that the data were not normally distributed (Tables 41 and 43), this analysis used Spearman's correlations to examine the relationship between teacher reports and direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. These variables were based on the teachers' ratings of the change in children's phonological awareness, expressive vocabulary, hyperactivity, good behaviour, and frustration control on a scale from 1 (much decline) to 5 (much improvement) over the duration of the intervention (Appendix D). Teacher's scores on children's hyperactivity, good behaviour and frustration control were averaged to generate the teacher report of children's self-regulation skills as hyperactivity, good behaviour and frustration control are components of self-regulation.

6.2 Results

6.2.1 T-tests for gender and EAL status. Table 48 contains the results of the t-tests for gender with respect to the pre-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy skills. There was no significant difference in the pre-test scores of the Head, Toes, Knees and Shoulders Task for males (M = 17.92, SD = 17.71) and females (M = 22.50, SD = 17.10); $t(96) = -1.64$, $p = .10$, small effect size. There was no significant difference in the pre-test scores of phonological awareness for males (M = 7.58, SD = 5.39) and females (M = 9.56, SD = 6.11); $t(96) = -1.79$, $p = .07$, small effect size. There was a significant difference in the pre-test scores of expressive vocabulary for males (M = 15.46, SD = 7.99) and females (M = 18.96, SD = 8.47); $t(96) = -2.98$, $p = .003$, small effect size. There was no significant difference in the pre-test scores of working memory for males (M = .52, SD = .16) and females (M = .50, SD = .13); $t(96) = -1.30$, $p = .20$, small effect size. There was no significant difference in the pre-test scores of pre-literacy for males (M = 82.52, SD = 16.94) and females (M = 85.86, SD = 17.38); $t(96) = -1.12$, $p = .26$, small effect size.

Table 48

T-Test Results for Pre-Test Scores of the Dependent Variables by Gender for Schools II and III

	Gender						95% CI for Mean Difference				
	Male			Female							
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*	*p*	*r*
HTKS Task	17.92	17.71	48	22.50	17.10	50	-25.43, 2.37	-1.64	96	.10	.13
PA	7.58	5.39	48	9.56	6.11	50	-3.89, .19	-1.79	96	.07	.17
EV	15.46	7.99	48	18.96	8.47	50	-6.58, -1.33	-2.98	96	.003	.21
WM	.52	.16	48	.50	.13	50	-4.75, 23.00	-1.30	96	.20	-.08
PL	82.52	16.94	48	85.86	17.38	50	-21.93, 6.03	-1.12	96	.26	.10

Note. r = .10, small effect size; r = .30, medium effect size; r =.50, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 49 displays the results of the t-tests for EAL status with respect to the pre-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy skills. There was a significant difference in the pre-test scores of the Head, Toes, Knees and Shoulders Task for native English speakers (M = 22.11, SD = 18.16) and children with EAL (M = 16.24, SD = 15.49); $t(96) = 2.32$, $p = .02$, small effect size. There was no significant difference in the pre-test scores of phonological awareness for native English speakers (M = 9.12, SD = 5.84) and children with EAL (M = 7.50, SD = 5.60); $t(96) = 1.88$, $p = .06$, small effect size. There was a significant difference in the pre-test scores of expressive vocabulary for native English speakers (M = 19.88, SD = 7.39) and children with EAL (M = 11.81, SD = 7.76); $t(96) = 6.98$, $p < .001$, medium effect size. There was a significant difference in the pre-test scores of working memory for native English speakers (M = .51, SD = .14) and children with EAL (M = .52, SD = .15); $t(96) = -3.72$, $p < .001$, small effect size. There was a significant difference in the pre-test scores of pre-literacy for native English speakers (M = 87.41, SD = 16.25) and children with EAL (M = 77.66, SD = 17.36); $t(96) = 2.17$, $p = .03$, small effect size.

Table 49

T-Test Results for Pre-Test Scores of the Dependent Variables by EAL Status for Schools II and III

	EAL Status						95% CI for Mean Difference				
	Not EAL			EAL							
	M	*SD*	*n*	*M*	*SD*	*n*		*t*	*df*	*p*	*r*
HTKS Task	22.11	18.16	66	16.24	15.49	32	2.41, 30.05	2.32	96	.02	-.15
PA	9.12	5.84	66	7.50	5.60	32	-.11, 4.01	1.88	96	.06	-.13
EV	19.88	7.39	66	11.81	7.76	32	5.96, 10.66	6.98	96	< .001	-.45
WM	.51	.14	66	.52	.15	32	-39.09, -11.96	-3.72	96	< .001	.003
PL	87.41	16.25	66	77.66	17.36	32	1.38, 29.11	2.17	96	.03	-.27

Note. r = .10, small effect size; r = .30, medium effect size; r =.50, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

6.2.2 Simple linear regression analysis for age. Table 50 displays the results and descriptive statistics of the regression analysis for age with respect to the pre-test scores of the Head, Toes, Knees and Shoulders Task; phonological awareness; expressive vocabulary; working memory; and pre-literacy skills. Age significantly predicted the pre-test scores of the Head, Toes, Knees and Shoulders Task (β = 5.70, p < .001), small effect size. Age significantly predicted the pre-test scores of phonological awareness (β = .49, p < .001), small effect size. Age significantly predicted the pre-test scores of expressive vocabulary (β = .65, p = .18), small effect size. Age did not significantly predict the pre-test scores of working memory (β = 1.58, p = .09), small effect size. Age significantly predicted the pre-test scores of pre-literacy (β = .48, p < .001), small effect size.

Table 50

Results of Simple Linear Regression Analysis for the Pre-Test Predictors by Age for Schools II and III

Predictor	β	*SE*	*p*	Adjusted r^2
HTKS Task	5.70	.83	< .001	.23
PA	.49	.13	< .001	.07
EV	.65	.18	< .001	.08
WM	1.58	.94	.09	.01
PL	.48	.87	< .001	.16

Note. Adjusted r^2 = .10, small effect size; Adjusted r^2 = .36, medium effect size; Adjusted r^2 =.51, large effect size

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

6.2.3 Path analysis of the dependent variables at baseline. The correlation between the variables is shown in Table 51, and the coefficient (β), standard error (*SE*), p-value (*p*), and the standardized path coefficients (Std.all) for the models without and with age for each of the predictors are shown in Table 52 and 53. The output path diagrams without and with age is presented in Figures 7 and 8. For the output model without age (Table 52), With regards to the pre-test scores on the Head, Toes, Knees and Shoulders Task, gender (β = 4.35, *p* = .42) and pre-test scores of expressive vocabulary (β = .35 *p* = .07) were not significant predictors of the children's pre-test scores on the Head, Toes, Knees and Shoulders Task, with small and medium effect size respectively. In terms of the pre-test scores on phonological awareness, pre-test scores on expressive vocabulary (β = .28, *p* = .002) were significant

predictors, small effect size. Gender was not a significant predictor of the children's pre-test scores on phonological awareness (β = 2.95, p = .54), small effect size. In relation with the pre-test scores on expressive vocabulary, EAL status (β = -26.22, p < .001) was the only significant predictor with girls outperforming boys, medium effect size. Gender (β = 7.83, p = .10), and pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .18, p = .32) were not significant predictors of the children's pre-test scores on expressive vocabulary, small effect size. With regards to pre-test scores on working memory, pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .15, p = .12) were not significant predictors, small effect size. Lastly in terms of the pre-test scores on pre-literacy, EAL status (β = -16.56, p = .002) was a significant predictor with older children and girls outperforming younger children and boys, small effect size.

For the output model with age (Table 53), for the pre-test scores on the Head, Toes, Knees and Shoulders Task, age (β = 3.43, p < .001) was the only significant predictor, medium effect size. Gender (β = 3.17, p = .49) and pre-test scores of expressive vocabulary (β = .25 p = .15) were not significant predictors of the children's pre-test scores on the Head, Toes, Knees and Shoulders Task, small effect size. In terms of the pre-test scores on phonological awareness, age (β = 1.88, p = .01) and pre-test scores on expressive vocabulary (β = .24, p = .01) were significant predictors, small effect size. Gender was not a significant predictor of the children's pre-test scores on phonological awareness (β = 2.98, p = .54), small effect size. In relation with the pre-test scores on expressive vocabulary, EAL status (β = -25.42, p < .001) was the only significant predictor with girls outperforming boys, medium effect size. Age (β = 1.62, p = .12), gender (β = 7.21, p = .12), and pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .13, p = .53) were not significant predictors of the children's pre-test scores on expressive vocabulary, small effect size. With regards to pre-test scores on working memory, age (β = .90, p = .28), and pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .10, p = .38) were not significant predictors, small effect size. Lastly in terms of the pre-test scores on pre-literacy, age (β = 2.88, p < .001), and EAL status (β = -14.52, p = .004) were significant predictors with older children and girls outperforming younger children and boys. Age had a medium effect size and EAL status had a small effect size on the children's pre-test scores on pre-literacy.

Table 51

Pearson's Correlation for the Variables in the Path Analysis of Baseline Data for Schools II and III

Variable	1	2	3	4	5	6	7
Pre-Test HTKS (1)							
Pre-Test PA (2)	.48**						
Pre-Test EV (3)	.51**	.36**					
Pre-Test WM (4)	.19	.09	.10				
Pre-Test PL (5)	.50**	.49**	.31**	.18			
Age (6)	.57**	.35**	.35**	.19	.42**		
Gender (7)	.14	.15	.19*	-.13	.10	.08	
EAL Status (8)	-.17	-.14	-.47**	-.08	-.28**	-.10	-.06

Note. * $p < .05$, ** $p < .01$

Abbreviations: HTKS, Head, Toes, Knees and Shoulders; PA, phonological awareness; EV, expressive vocabulary; WM, working memory; PL, pre-literacy.

Table 52

Path Analysis Results for the Baseline Data for Schools II and III without Age

Variable	*β*	*SE*	*p*	Std.all
Pre-Test HTKS Task				
Gender	4.35	5.35	.42	.08
Pre-Test EV	.35	.19	.07	.35
Pre-Test PA				
Gender	2.95	4.86	.54	.05
Pre-Test EV	.28	.09	.002	.28
Pre-Test EV				
Gender	7.83	4.75	.10	.14
EAL	-26.22	5.17	< .001	-.44
Pre-Test HTKS Task	.18	.18	.32	.18
Pre-Test WM				
Pre-HTKS	.15	.10	.12	.16
Pre-Test PL				
EAL	-16.56	5.33	.002	-.28

Note. Std.all refers to the standardized path coefficients

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness; WM, working memory; PL, pre-literacy.

Table 53

Path Analysis Results for the Baseline Data for Schools II and III with Age

Variable	*β*	*SE*	*p*	Std.all
Pre-Test HTKS Task				
Age	3.43	.70	< .001	.47
Gender	3.17	4.60	.49	.06
Pre-Test EV	.25	.18	.15	.24
Pre-Test PA				
Age	1.88	.70	.01	.26
Gender	2.98	4.82	.54	.05
Pre-Test EV	.24	.09	.01	.24
Pre-Test EV				
Age	1.62	1.03	.12	.22
Gender	7.21	4.61	.12	.13
EAL	-25.42	4.99	< .001	-.42
Pre-Test HTKS Task	.13	.21	.53	.13
Pre-Test WM				
Age	.90	.83	.28	.13
Pre-HTKS	.10	.12	.38	.10
Pre-Test PL				
Age	2.88	.65	< .001	.40
EAL	-14.52	5.01	.004	-.24

Note. Std.all refers to the standardized path coefficients

Abbreviations: HTKS Task, Head, Toes, Knees and Shoulders Task; EV, expressive vocabulary; PA, phonological awareness; WM, working memory; PL, pre-literacy.

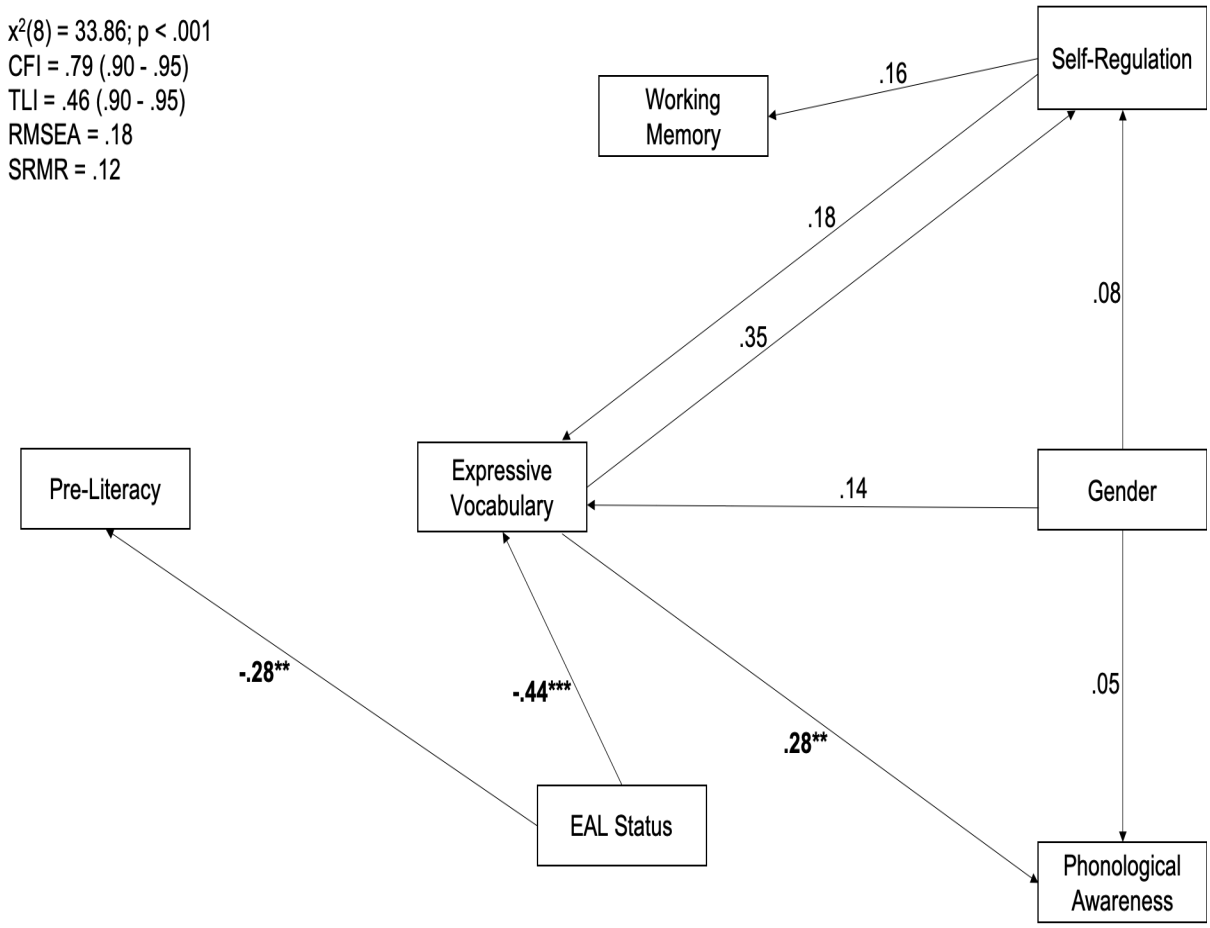

Figure 7. Output path diagram for baseline data from Schools II and III without age. Fit indices for Path Analysis with Factor Loads; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean-square Residual.

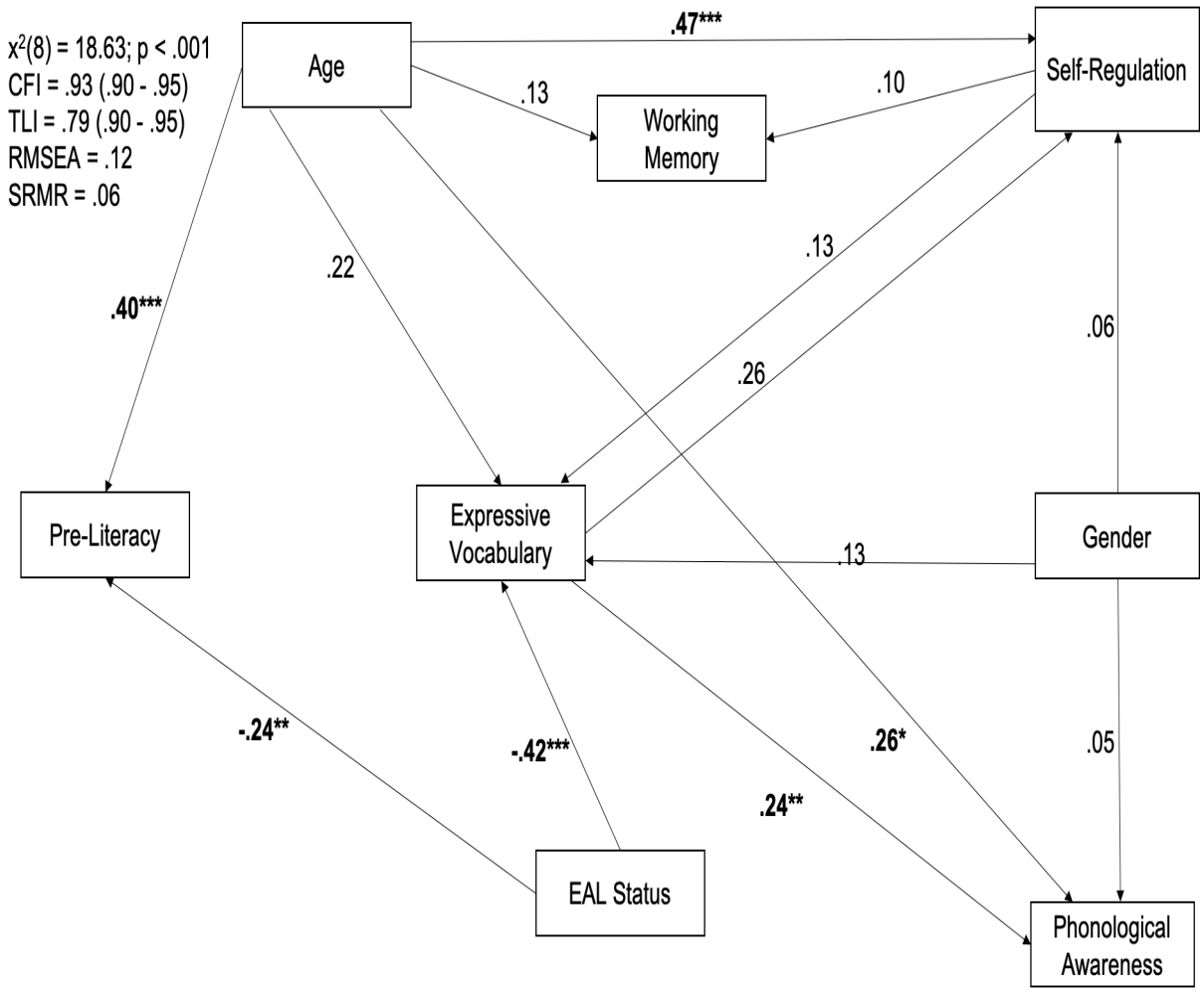

Figure 8. Output path diagram for baseline data from Schools II and III with age. Fit indices for Path Analysis with Factor Loads; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation; SRMR, Standardized Root Mean-square Residual.

6.2.4 Hierarchical regression for the post-test scores of the dependent variables.

The results of the hierarchical regression analysis without and with age for Schools II and III are outlined in Table 54-58. To begin with the hierarchical regression analysis without age, for the post-test scores of the Head, Toes, Knees and Shoulders Task (Table 54), Model 2 was the best fitting model with the pre-test scores on the Head, Toes, Knees and Shoulders Task (β = .59, p < .001) and pre-test scores on working memory (β = .15, p = .046) found to be significant predictors. The group the children were randomized to was not a significant predictor of children's post-test scores on the Head, Toes, Knees and Shoulders Task. In terms of the effect size for Model 2 for the post-test scores of the Head, Toes, Knees and Shoulders Task, the adjusted R^2 = .57 demonstrated that there was a large effect.

For the hierarchical regression analysis for the post-test scores of phonological awareness without age (Table 55), Model 3 was the best fitting model with the pre-test scores on phonological awareness (β = .44, p < .001) and pre-test scores on pre-literacy (β = .29, p = .001) found to be significant predictors. Additionally, the group that the children were randomized to was a significant predictor of children's post-test scores of phonological awareness as children in the guided play group outperformed the children in the typical curriculum group (β = -15.04, p = .003). In terms of the effect size for Model 3 for the post-test scores of phonological awareness, the adjusted R^2 = .53 demonstrated that there was a large effect.

For the hierarchical regression analysis for the post-test scores of expressive vocabulary without age (Table 56), Model 2 was the best fitting model with gender (β = 7.93, p = .04), pre-test scores on expressive vocabulary (β = .67, p < .001), and pre-test scores on pre-literacy (β = .21, p = .01) found to be significant predictors. Girls outperform boys on their post-test scores of expressive vocabulary. The group the children were randomized to was not a significant predictor of children's post-test scores on expressive vocabulary. In terms of the effect size for Model 2 for the post-test scores of expressive vocabulary, the adjusted R^2 = .39 demonstrated that there was a medium effect.

For the hierarchical regression analysis for the post-test scores of working memory without age (Table 57), Models 2 and 3 did not have a significant change in the portion of the variance that was explained (ΔR^2 = .00) when the group that the children were randomized to were added to Model 3. Finally, for the hierarchical regression analysis for the post-test scores of pre-literacy without age (Table 58), Model 3 was the best fitting model with the pre-test scores on pre-literacy (β = .49, p < .001) found to be the only significant predictor. Additionally, the group that the children were randomized to was a significant predictor of children's post-test scores of pre-literacy as children in the guided play group outperformed the children in the typical curriculum group (β = -10.71, p = .04). In terms of the effect size for Model 3 for the post-test scores of pre-literacy, the adjusted R^2 = .42 demonstrated that there was a medium effect.

Table 54

Hierarchical Regression Analysis for the Post-Test Scores of the Head, Toes, Knees and Shoulders Task for Schools II and III without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	48.09	4.56	< .001	-2.36	6.66	.72	-6.22	6.94	.37
Gender	8.89	5.65	.12	3.63	3.88	.35	3.64	3.83	.34
EAL Status	-9.57	6.02	.12	1.60	4.68	.73	-.07	4.70	.99
Pre-test PA				.09	.08	.27	.08	.08	.32
Pre-test EV				.09	.09	.33	.08	.09	.39
Pre-test HTKS				.59	.09	< .001	.58	.09	< .001
Pre-Test WM				.15	.07	.046	.14	.07	.06
Pre-Test PL				.09	.08	.26	.11	.08	.19
Art							11.35	5.33	.03
TC							4.61	4.62	.32
R^2		.05			.61***			.63	
Adjusted R^2		.03			.57			.59	
F		2.65			19.74			16.30	
ΔR^2					.56			.02	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 55

Hierarchical Regression Analysis for the Post-Test Scores of Phonological Awareness for Schools II and III without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	47.93	4.58	< .001	3.06	7.34	.68	8.25	7.38	.27
Gender	8.50	5.67	.14	1.88	4.27	.66	1.46	4.07	.72
EAL Status	-8.48	6.05	.16	3.58	5.16	.49	2.03	5.00	.69
Pre-Test PA				.42	.09	< .001	.44	.09	< .001
Pre-test EV				.10	.10	.29	.13	.09	.16
Pre-test HTKS				.10	.10	.33	.06	.09	.49
Pre-Test WM				-.03	.08	.75	.04	.08	.64
Pre-Test PL				.31	.09	.001	.29	.09	.001
Art							-2.37	5.67	.68
TC							-15.04	4.91	.003
R^2		.04			.52***			.58**	
Adjusted R^2		.02			.48			.53	
F		2.24			14.02			13.35	
ΔR^2					.48			.06	

Note. **$p < .01$, ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 56

Hierarchical Regression Analysis for the Post-Test Scores of Expressive Vocabulary for Schools II and III without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	48.88	4.13	< .001	8.24	6.55	.21	7.68	6.93	.27
Gender	15.53	5.11	.003	7.93	3.82	.04	7.82	3.82	.04
EAL Status	-22.36	5.45	< .001	-.85	4.60	.85	-2.11	4.69	.65
Pre-Test PA				-.02	.08	.84	-.01	.08	.88
Pre-test EV				.67	.09	< .001	.68	.09	< .001
Pre-test HTKS				-.02	.09	.82	-.03	.09	.75
Pre-Test WM				-.09	.07	.22	-.07	.07	.31
Pre-Test PL				.21	.08	.01	.21	.08	.01
Art							5.09	5.32	.34
TC							-1.72	4.61	.71
R^2		.23			.62***			.63	
Adjusted R^2		.21			.59			.59	
F		13.79			20.98			16.48	
ΔR^2					.39			.01	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum

Table 57

Hierarchical Regression Analysis for the Post-Test Scores of Working Memory for Schools II and III without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	49.67	4.58	< .001	21.16	9.65	.03	21.36	10.29	.04
Gender	-.69	5.68	.90	-.63	5.62	.91	-.54	5.67	.92
EAL Status	.54	6.05	.93	8.53	6.78	.21	9.49	6.96	.18
Pre-Test PA				.11	.12	.36	.10	.12	.38
Pre-test EV				.24	.13	.06	.24	.13	.07
Pre-test HTKS				-.12	.13	.36	-.11	.13	.39
Pre-Test WM				.29	.10	.01	.28	.11	.01
Pre-Test PL				.002	.12	.99	< .001	.12	1.00
Art							-3.57	7.91	.65
TC							1.80	6.84	.79
R^2		.0003			.14**			.14	
Adjusted R^2		-.02			.07			.05	
F		.01			2.01			1.60	
ΔR^2					.14			.00	

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted R^2 = .10, small effect size; Adjusted R^2 = .36, medium effect size; Adjusted R^2 = .51, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 58

Hierarchical Regression Analysis for the Post-Test Scores of Pre-Literacy for Schools II and III without Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	48.46	4.49	< .001	8.23	8.03	.30	10.22	8.14	.21
Gender	9.20	5.56	.10	5.68	4.70	.23	5.28	4.49	.24
EAL Status	-11,17	5.93	.06	.03	5.64	1.00	-2.68	5.51	.63
Pre-Test PA				.14	.10	.16	.16	.09	.09
Pre-test EV				.05	.11	.65	.06	.10	.51
Pre-test HTKS				.02	.11	.87	-.01	.10	.92
Pre-Test WM				.08	.09	.38	.13	.09	.13
Pre-Test PL				.49	.10	< .001	.49	.10	< .001
Art							6.31	6.25	.32
TC							-10.71	5.41	.05
R^2		.07			.42***			.48**	
Adjusted R^2		.05			.37			.42	
F		3.34			9.16			8.88	
ΔR^2					.35			.06	

Note. $^{**}p < .01$, $^{***}p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

For the hierarchical regression analysis with age, in connection with the post-test scores of the Head, Toes, Knees and Shoulders Task (Table 59), Model 2 was the best fitting model with the pre-test scores on the Head, Toes, Knees and Shoulders Task ($\beta = .59$, $p < .001$) and pre-test scores on working memory ($\beta = .15$, $p = .046$) found to be significant predictors. The group the children were randomized to was not a significant predictor of children's post-test scores on the Head, Toes, Knees and Shoulders Task. In terms of the effect size for Model 2 for the post-test scores of the Head, Toes, Knees and Shoulders Task, the adjusted $R^2 = .57$ demonstrated that there was a large effect.

For the hierarchical regression analysis for the post-test scores of phonological awareness with age (Table 60), Model 3 was the best fitting model with the pre-test scores on phonological awareness ($\beta = .44$, $p < .001$) and pre-test scores on pre-literacy ($\beta = .28$, $p = .002$) found to be significant predictors. Additionally, the group that the children were randomized to was a significant predictor of children's post-test scores of phonological awareness as children in the guided play group outperformed the children in the typical curriculum group ($\beta = -15.46$, $p = .003$). In terms of the effect size for Model 3 for the post-test scores of phonological awareness, the adjusted $R^2 = .53$ demonstrated that there was a large effect.

For the hierarchical regression analysis for the post-test scores of expressive vocabulary with age (Table 61), Model 2 was the best fitting model with gender ($\beta = 7.95$, $p = .04$), pre-test scores on expressive vocabulary ($\beta = .67$, $p < .001$), and pre-test scores on pre-literacy ($\beta = .20$, $p = .02$) found to be significant predictors. Girls outperform boys on their post-test scores of expressive vocabulary. The group the children were randomized to was not a significant predictor of children's post-test scores on expressive vocabulary. In terms of the effect size for Model 2 for the post-test scores of expressive vocabulary, the adjusted $R^2 = .59$ demonstrated that there was a large effect.

For the hierarchical regression analysis for the post-test scores of working memory with age (Table 62), Models 2 and 3 did not have a significant change in the portion of the variance that was explained ($\Delta R^2 = .00$) when the group that the children were randomized to were added to Model 3. Finally, for the hierarchical regression analysis for the post-test scores of pre-literacy with age (Table 63), Model 3 was the best fitting model with the pre-test scores on pre-literacy ($\beta = .47$, $p < .001$) found to be the only significant predictor. Additionally, the group that the children were randomized to was a significant predictor of children's post-test scores of pre-literacy as children in the guided play group outperformed the children in the

typical curriculum group (β = -11.89, p = .04). In terms of the effect size for Model 3 for the post-test scores of pre-literacy, the adjusted R^2 = .42 demonstrated that there was a medium effect.

Table 59

Hierarchical Regression Analysis for the Post-Test Scores of the Head, Toes, Knees and Shoulders Task for Schools II and III with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-150.79	41.96	< .001	1.41	35.53	.97	7.41	35.64	.84
Age	3.14	.66	< .001	-.07	.60	.91	-.24	.62	.70
Gender	7.01	5.11	.17	3.63	3.90	.36	3.64	3.85	.35
EAL Status	-7.14	5.46	.19	1.64	4.72	.73	.10	4.74	.98
Pre-test PA				.09	.08	.27	.08	.08	.32
Pre-test EV				.09	.09	.33	.08	.09	.31
Pre-test HTKS				.59	.10	< .001	.60	.10	< .001
Pre-Test WM				.15	.07	.046	.14	.07	.06
Pre-Test PL				.10	.09	.26	.11	.08	.18
Art							11.66	5.42	.03
TC							5.07	4.79	.29
R^2		.24			.61***			.63	
Adjusted R^2		.21			.57			.58	
F		9.73			17.09			14.54	
ΔR^2					.37			.02	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 60

Hierarchical Regression Analysis for the Post-Test Scores of Phonological Awareness for Schools II and III with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-95.25	44.55	.04	17.86	39.12	.65	-4.31	37.86	.91
Age	2.26	.70	.002	-.26	.67	.70	.22	.65	.74
Gender	7.15	5.43	.19	1.87	4.29	.66	1.46	4.09	.72
EAL Status	-6.73	5.79	.25	3.75	5.20	.47	1.88	5.04	.71
Pre-Test PA				.42	.09	< .001	.44	.09	< .001
Pre-test EV				.11	.10	.28	.13	.09	.17
Pre-test HTKS				.11	.11	.30	.05	.10	.62
Pre-Test WM				-.02	.08	.77	.04	.08	.65
Pre-Test PL				.31	.09	.001	.28	.09	.002
Art							-2.66	5.76	.65
TC							-15.46	5.09	.003
R^2		.14			.52***			.58**	
Adjusted R^2		.11			.48			.53	
F		5.11			12.17			11.91	
ΔR^2					.38			.06	

Note. $^{**}p < .01$, $^{***}p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted R^2 = .10, small effect size; Adjusted R^2 = .36, medium effect size; Adjusted R^2 = .51, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 61

Hierarchical Regression Analysis for the Post-Test Scores of Expressive Vocabulary for Schools II and III with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-82.00	40.10	.04	-15.76	34.87	.65	-20.15	35.45	.57
Age	2.07	.63	.001	.42	.59	.49	.49	.61	.43
Gender	14.29	4.88	.004	7.95	3.83	.04	7.82	3.82	.04
EAL Status	-20.76	5.21	< .001	-1.14	4.64	.81	-2.44	4.72	.60
Pre-Test PA				-.02	.08	.83	-.01	.08	.88
Pre-test EV				.67	.09	< .001	.67	.09	< .001
Pre-test HTKS				.04	.09	.64	-.06	.10	.55
Pre-Test WM				-.09	.07	.20	-.08	.07	.30
Pre-Test PL				.20	.08	.02	.19	.08	.02
Art							4.45	5.39	.41
TC							-2.66	4.76	.58
R^2		.30			.62***			.63	
Adjusted R^2		.28			.59			.59	
F		13.73			18.24			14.84	
ΔR^2					.32			.01	

Note. ***$p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum

Table 62

Hierarchical Regression Analysis for the Post-Test Scores of Working Memory for Schools II and III with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-46.78	45.92	.31	-52.31	50.87	.31	-52.70	52.21	.32
Age	1.52	.72	.04	1.27	.87	.14	1.30	.90	.15
Gender	-1.60	5.59	.77	-.58	5.59	.92	-.54	5.64	.92
EAL Status	1.72	5.97	.77	7.66	6.76	.26	8.61	6.95	.22
Pre-Test PA				.10	.12	.38	.10	.12	.38
Pre-test EV				.22	.13	.08	.22	.13	.09
Pre-test HTKS				-.19	.14	.17	-.19	.14	.18
Pre-Test WM				.28	.10	.01	.28	.11	.01
Pre-Test PL				-.03	.12	.81	-.04	.12	.78
Art							-5.26	7.94	.51
TC							-.70	7.01	.92
R^2		.05			.16			.16	
Adjusted R^2		.02			.08			.06	
F		1.49			2.05			1.67	
ΔR^2					.11			.00	

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted R^2 = .10, small effect size; Adjusted R^2 = .36, medium effect size; Adjusted R^2 = .51, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

Table 63

Hierarchical Regression Analysis for the Post-Test Scores of Pre-Literacy for Schools II and III with Age

	Model 1			Model 2			Model 3		
	β	*SE*	*p*	*β*	*SE*	*p*	*β*	*SE*	*p*
Intercept	-89.34	43.75	.04	-6.61	42.83	.88	-24.55	41.62	.56
Age	2.18	.69	.002	.26	.73	.73	.61	.72	.40
Gender	7.89	5.33	.14	5.69	4.70	.23	5.28	4.49	.24
EAL Status	-9.49	5.69	.10	-.14	5.69	.98	-3.09	5.54	.58
Pre-Test PA				.14	.10	.16	.16	.09	.09
Pre-test EV				.04	.11	.68	.06	.10	.55
Pre-test HTKS				.003	.12	.98	-.05	.11	.67
Pre-Test WM				.07	.09	.40	.13	.09	.14
Pre-Test PL				.49	.10	< .001	.47	.10	< .001
Art							5.51	6.33	.39
TC							-11.89	5.59	.04
R^2		.16			.42***			.48**	
Adjusted R^2		.13			.36			.42	
F		5.78			7.95			8.04	
ΔR^2					.26			.06	

Note. $^{**}p < .01$, $^{***}p < .001$

Note. Gender (1, female; 0, male)

Note. EAL Status (1, EAL; 0, not EAL)

Note. Adjusted $R^2 = .10$, small effect size; Adjusted $R^2 = .36$, medium effect size; Adjusted $R^2 = .51$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary; HTKS, Head, Toes, Knees and Shoulders; TC, typical curriculum.

6.2.5 Correlations between the teacher evaluations and the direct measures. The results of the Pearson's and Spearman's correlations for the teacher evaluations and the direct measures are presented in Table 64. There was agreement between the Spearman's and Pearson's correlations in all three cases, I include the Spearman's correlations alongside the Pearson's correlations as the data were not normally distributed. The strongest correlation was between the teacher evaluations and the change in the children's scores on the Phonological Awareness subtest of the CELF-P2 over the duration of the intervention: $r(96) = .27$, $p < .01$, small effect size. There were no significant correlations between the teacher evaluations and the change in the children's scores on the Head, Toes, Knees and Shoulders Task ($r(96) = -.05$, $p > .05$), small effect size and the teacher evaluations and the change in the children's scores on the Expressive Vocabulary subtest of the CELF-P2 ($r(96) = -.08$, $p > .05$), small effect size.

Table 64

Correlations between the Teacher Evaluations and the Direct Measures for Schools II and III

Measure	Teacher Evaluations	
	Spearman's	Pearson's
Self-Regulation	-.05	-.11
PA	.27**	.29**
EV	-.08	.03

Note. $^{**}p < .01$

Note. $r = .10$, small effect size; $r = .30$, medium effect size; $r = .50$, large effect size

Abbreviations: PA, phonological awareness; EV, expressive vocabulary.

6.3 Discussion

6.3.1 Key contributions of the relationship between children's self-regulation, language, pre-literacy, and working memory skills upon entry into reception. Despite the smaller sample ($N = 98$) from Schools II and III as opposed to the sample from all three schools ($N = 151$), the findings from the present analysis mostly confirm those of the previous chapter. Older children had higher pre-test scores on the Head, Toes, Knees and Shoulders Task, phonological awareness, and pre-literacy. Expressive vocabulary was the only predictor of children's pre-test scores on phonological awareness. Native English speakers had higher expressive vocabulary scores at baseline in comparison to their peers with EAL. Age and pre-

test scores on the Head, Toes, Knees and Shoulders Task were both not significant predictors of children's working memory skills.

6.3.2 Key contributions of the efficacy of using a guided play intervention with elements of pretense on the self-regulation, language, working memory, and pre-literacy skills of 4- to 5-year-olds with EAL. As was the case with the data from all three schools for both my models (without and with age), the group that the children were randomized to was a significant predictor of the children's post-test scores of phonological awareness, with children in the guided play group having higher post-test scores on phonological awareness than their peers who were exposed to typical curriculum. Additionally, the group that the children were randomized to was a significant predictor of the children's post-test scores of pre-literacy, with children in the guided play group having higher post-test scores on pre-literacy than their peers who were exposed to typical curriculum.

6.3.3 Key contributions of the correlation between the teacher evaluations and the direct measures of children's self-regulation skills, phonological awareness, and expressive vocabulary. The strongest correlation was between the teacher evaluations and the change in the children's scores on the Phonological Awareness subtest of the CELF-P2 over the duration of the intervention.

6.3.4 The relationship between children's self-regulation, language, working memory, and pre-literacy skills upon entry into reception. The conflicting results of the fit of both my models (without and with age) may be attributed to the small sample size. Therefore, when examining the predictors of the variables as indicated by my model, the small sample size needs to be taken into consideration. Nonetheless, the results for the pre-test scores for the Head, Toes, Knees, and Shoulders Task, phonological awareness, and expressive vocabulary in this reduced sample from both my models (without and with age) mostly matched those presented when the data were analyzed from all three schools. Though the results were largely consistent for both my models (without and with age), there were a couple of exceptions from the previous chapter as pre-test scores on expressive vocabulary was not a predictor of children's pre-test scores on the Head, Toes, Knees and Shoulders Task, and gender was not a predictor of children's expressive vocabulary skills. This finding was contrary to that of Bohlmann et al. (2015) who noted a bidirectionality between expressive vocabulary and self-regulation skills among native English-speaking preschoolers and their peers with EAL.

Given that the analysis of data from Schools II and III is underpowered, it highlights the need for further research in the area, particularly in terms of the relationship between self-regulation and expressive vocabulary for monolingual children and their peers with EAL. Another difference in the findings from the previous chapter that included the data from all three schools for both my models (without and with age) was that gender was not a significant predictor of children's expressive vocabulary skills at baseline. This result differs from that of Chipere (2014) and Sherman (1967) who suggested that girls may have higher expressive vocabulary skills than boys in early childhood for biological or sociological reasons. Perhaps the influence of gender on children's expressive vocabulary might be attributed to the child's language environment in the home. For children with EAL, the girls are more likely to maintain the family's native language than the boys (Portes & Hao, 2002) but unfortunately I could not include this exploratory variable in my analysis.

Once the pre-test scores of working memory and pre-literacy were added to the model, the results showed that age was a significant predictor of children's pre-literacy scores at baseline with older children obtaining higher scores with a medium effect. Lonigan (2006) highlight that children advance their pre-literacy skills in early childhood as a result of development promotion of pre-literacy activities both at home and at school. Given this development in children's early childhood, Lonigan suggested the use of age-standardized scores when examining the pre-literacy skills of children over a two-year period. In addition, unlike the findings of Carlson et al. (2002), age was not a significant predictor of children's working memory scores at baseline. Carlson et al's study demonstrated that for each of the working memory tasks including Backword Digit Span (Davis & Pratt, 1995), and Backword Word Span (adapted from Davis and Pratt, 1995) there were age-related changes. Perhaps the difference in the results in my study and that of Carlson et al. was that my study used different measures for working memory.

Different to the findings of the study by Carlson et al. (2002), the pre-test scores on the Head, Toes, Knees and Shoulders Task from both my models (without and with age) did not significantly predict children's working memory scores at baseline. This result suggests that conflicting self-regulation tasks such as the Head, Toes, Knees and Shoulders Task may not necessarily require higher working demands as suggested by Carlson and Meltzoff (2008) but a larger sample size is required to further evaluate this finding. It would also be interesting to examine if this finding holds true for this sample should the children be assessed using other conflict behaviour regulation measures in addition to the Head, Toes, Knees and Shoulders Task or whether this finding is specific to the Head, Toes, Knees and Shoulders

Task. Lastly, for both my models (without and with age), EAL status was shown to significantly predict children's pre-test scores on pre-literacy as suggested by Lesaux and Siegel (2003) where native English speakers had higher scores than the children with EAL. There was a small effect size for the influence of EAL status on the children's pre-test scores on pre-literacy. Foorman and Torgesen (2001) highlight that children with EAL enter school having difficulties with their preliteracy skills and Lesaux and Siegel suggest that at this early stage children with EAL have the additonal challenge of manipulating and remembering English, a language they might not be familiar with. Consequently, Lesaux and Siegel demonstrated that although children with EAL may have lower pre-literacy skills than their native English speaking peers, by age seven they most often reduce this gap and in some cases, they even outperform their native English speaking peers.

6.3.5 The guided play intervention was efficacious for children's post-test scores on phonological awareness and pre-literacy. The hierarchical regression analysis for both my models (without and with age) demonstrated that the group that the children were randomized to was a significant predictor of children's phonological awareness and pre-literacy skills. In the best fitting model for the Head, Toes, Knees and Shoulders task for both my models (without and with age), the results mostly matched those in the previous chapter which included data from all three schools. As noted in the previous chapter, there was no significant change in the variance when the group that the children were randomized to was added to the model. However, for both my models (without and with age) the children's pre-test scores on phonological awareness were not a significant predictor of the children's post-test scores on the Head, Toes, Knees and Shoulders Task as was the case with the data from all three schools. The same difference was noted in the case of the children's post-test scores on phonological awareness for both my models (without and with age) as the pre-test scores on the Head, Toes, Knees and Shoulders Task were not a significant predictor. Von Suchodoletz et al. (2013) conducted a study and one of the aims was to examine the relationship between children's self-regulation and emergent literacy skills including phonological awareness. Von Suchodoletz et al. also used the Head, Toes, Knees and Shoulders Task as a direct measure of children's self-regulation skills and the findings showed that the scores on the Head, Toes, Knees and Shoulders Task related to children's scores on emergent literacy skills.

Perhaps in the case of my study in schools II and III, there might have been more emphasis on certain aspects of phonological awareness such as initial sounds and syllables but less emphasis in other areas such as rhyme. I noticed this occurrence when I spent time in the

classrooms in schools II and III. Furthermore, when children's pre-test scores of working memory and pre-literacy were added to both models (without and with age) of children's post-test scores on the Head, Toes, Knees and Shoulders Task, pre-test scores on working memory were a significant predictor. This finding could be influenced by the children's classroom that are designed as literacy-rich environments and throughout the day the children in reception are frequently given an opportunity to choose the activity thereby practicing their self-regulation skills (Nitecki & Chung, 2013). In terms of effect size, the best fitting model for the children's post-test scores on the Head, Toes, Knees and Shoulders Task had a large effect size.

In the case of the children's phonological skills, the best fitting model of the children's post-test PA scores for both my models (without and with age) mostly aligned with the findings in the previous chapter. In addition, the inclusion of working memory and pre-literacy for both my models (without and with age) suggested that children's pre-test scores on pre-literacy was a significant predictor of the children's post-test scores on phonological awareness. The relationship between children's pre-literacy and phonological awareness skills is aligned with the findings of Goikoetxea (2005) which showed that children gain awareness of some linguistic unit before they are able to read. This is contained within a developmental progress from large phonological units such as syllables to small phonological units such as phonemes. A finding in Goikoetxea's study was that preliterate children found it easier to make out ending linguistic units than beginning linguistic units, which is especially interesting as the explicit phonological awareness instruction in my intervention included the initial sound not the ending sound. Nevertheless, as seen in the previous chapter, there was a significant change in the variance for both my models (without and with age) when the group that the children were randomized to was added to the models as the study demonstrated that participation in the guided play intervention was beneficial to the development of children's phonological awareness skills. In particular, children in the guided play group had higher post-test scores on phonological awareness than their peers who were exposed to typical curriculum. As noted in the previous chapter, this finding could be due to the storybooks that were used in my study as they were all picture books. Strasser and Seplocha (2007) suggest that engaging the children in picture books allows for the development of their phonological awareness skills. This result suggests that possibly the shared storybook reading component of the intervention supported the development of the children's phonological awareness skills that the children in the typical curriculum group were not exposed to. In terms of effect size,

the best fitting model for the children's post-test scores on phonological awareness had a large effect size.

With regards to the children's post-test scores of expressive vocabulary, in the best fitting model the results were mostly similar to the findings from the previous chapter with data from all three schools for both my models (without and with age). However, the findings from the previous chapter also suggested that EAL status was a significant predictor of children's post-test scores on expressive vocabulary for both my models (without and with age) with native English speakers outperforming their peers with EAL which was not the case when the data from only Schools II and III were analyzed. Perhaps, as suggested by Portes and Hao (2002), the influence of gender on children's expressive vocabulary might be attributed to the children's language environment in the home because in the case of children with EAL, girls are more likely to maintain the family's native language than the boys. This influence of gender could be true with regards to both children's phonological awareness and expressive vocabulary skills. In terms of effect size, the best fitting model for the children's post-test scores on expressive vocabulary had a large effect size for the model with age and a medium effect size for the model without age. Moreover, when working memory and pre-literacy skills were added to both the models (without and with age), pre-test scores on pre-literacy were a significant predictor of children's post-test scores on expressive vocabulary. This finding is aligned with that of Chiappe, Chiappe, and Gottardo (2004) who highlight that expressive vocabulary was related to the individual differences in children's phonological awareness skills as per the phonological distinct hypothesis. Elbro (1996) suggests that in line with the phonological distinct hypothesis, children who are good readers have great features in their phonological representation of words compared to their peers who might be considered poor readers. Furthermore, as noted in the previous chapter, there was no significant change in the variance for both the models (without and with age) when the group that the children were randomized to was added to the models.

In connection with children's post-test scores on working memory which was not a measure that was used in the previous chapter, none of the variables were significant predictors of children's working memory skills for both my models (without and with age). Furthermore, there was no significant change in the variance when the pre-test scores of the direct measures and the group the children were randomized to were added to both the models (without and with age). This finding adds to the growing debate about the existence of a bilingual advantage for the development of children's executive function skills including working memory. Morton and Harper (2007) conducted a study using the Simon Task with 6-

and 7-year-olds to examine if there is a bilingual advantage which is in reference to the theory that bilinguals have greater selective attention and cognitive flexibility as they have had extensive practice in these areas as a result of coordinating between the two languages. Morton and Harper's findings suggested that as opposed to the bilingual advantage, differences in SES and ethnicity influence the development of children's executive function skills to a greater effect than their knowledge of two languages. Previous studies that have examined the influence of the bilingual advantage on children's executive function skills have rarely included measures of SES and ethnicity.

Finally, in terms of the children's post-test scores on pre-literacy, which was also not analyzed in the previous chapter, as expected children's performance on the pre-test scores of pre-literacy was a significant predictor of their post-test scores on the same measure for both my models (without and with age). Additionally, there was a significant change in the variance when the group that the children were randomized to was added to both my models (without and with age) with children in the guided pretend play group outperforming their peers who were exposed to typical curriculum on their post-test scores on pre-literacy. This finding supports the study that was conducted by Mielonen and Paterson (2009) during which one of the aims was to examine how children develop literacy competence when interacting with others. Mielonen and Paterson's study highlighted that when children have an opportunity to engage in pretend play activities and roleplay, they begin to learn the mechanics of language and social interaction and are able to connect the meaning associated with spoken language to written language. This, in turn, allows for the development of both their pre-literacy and literacy skills. In terms of effect size, the best fitting model for the children's post-test scores on pre-literacy had a medium effect size.

6.3.6 Low correlations between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. The effect sizes of the Pearson's and Spearman's correlations both demonstrate that there were small correlations between the teacher evaluations and the direct measures for the different measures for self-regulation, phonological awareness, and expressive vocabulary. Nonetheless, there was only a low significant correlation between the teacher reports and the direct measures for the children's phonological awareness skills. Durgunoğlu, Nagy, and Hancin-Bhatt (1993) findings regarding children's phonological awareness skills were supported by teacher reports although the teacher reports were not a measure that was included in the study. As far as I am aware, in most cases, teacher reports are used as the basis for including children in studies concerning phonological awareness development such as

with Pokorni, Worthington, and Jamison (2004) as opposed to comparing direct measures of children's phonological awareness with teacher reports; thereby, highlighting a gap in the literature. There is also a gap in the literature regarding teacher reports on children's expressive vocabulary skills. That being said both children's expressive vocabulary and phonological awareness skills can be measured using a variety of direct measures that might provide a more accurate representation of children's development in these areas in comparison to teacher reports.

In the case of children's self-regulation skills, the results do not align with the study by Matthews et al. (2009). A possible explanation is that although Matthews et al. used the Head, Toes, Knees and Shoulders Task to directly assess the children, in my study the teachers were asked to comment on different aspects of self-regulation separately and did not use a standardized measure such as the Child Behavior Rating Scale (Bronson et al., 1995). My study highlights the issue of validity of the results given the discrepancy between the teacher evaluations and the direct measures, which has been noted in the literature.

6.4 Conclusions

In terms of children's self-regulation, language, working memory, and pre-literacy skills upon entry into reception, age was a predictor of the pre-test scores on the Head, Toes, Knees and Shoulders Task, phonological awareness, and pre-literacy where older children had higher scores. Expressive vocabulary predicted children's pre-test scores on phonological awareness, and native English speakers had higher expressive vocabulary scores at baseline in comparison to their peers with EAL. In connection with the efficacy of the guided play intervention, my study highlights that the intervention was efficacious at the group level in connection with children's post-test scores on phonological awareness on pre-literacy. Lastly, there were low correlations between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills. The next and final chapter includes a general discussion, examination of the overall limitations of my study, and highlights prospects for further research.

Chapter Seven

General Discussion and Conclusions

7.1 Key Contributions

In terms of the data from all three schools, there were low positive correlations between the three self-regulation measures- the Statue Task, the Head, Toes, Knees and Shoulders Task, and the Gift Delay Task. The Head, Toes, Knees and Shoulders Task was used in the further analysis as it took into consideration the children's language competence and provided a practice component. Interestingly, as children's age and expressive vocabulary scores increased, their baseline scores on the Head, Toes, Knees and Shoulders Task and phonological awareness increased. Additionally, gender and EAL status were significant predictors of children's expressive vocabulary scores at baseline, where girls and native English speakers had higher expressive vocabulary scores than boys and children with EAL. In terms of the efficacy of the guided play intervention, the group that the children were randomized to (guided play, art activities or typical curriculum) was only a significant predictor of children's post-test phonological awareness scores. Specifically, children in the guided play group had significantly higher post-test phonological awareness scores than children who were exposed to typical curriculum.

The key contributions were similar for the data that were analyzed from Schools II and III, and Schools II and III also included measures of children's working memory and pre-literacy skills. Older children had higher baseline scores on the Head, Toes, Knees and Shoulders Task, phonological awareness, and pre-literacy. Expressive vocabulary was the only significant predictor of children's pre-test scores on phonological awareness. Native English speakers had higher expressive vocabulary scores at baseline in comparison to children with EAL. Moreover, age and pre-test scores on the Head, Toes, Knees and Shoulders Task were both not significant predictors of children's working memory skills. In terms of the efficacy of the guided play intervention on the self-regulation, language, working memory, and pre-literacy skills of 4- to 5-year-olds with EAL, the group that the children were randomized to was a significant predictor of the children's post-test scores of phonological awareness. Specifically, children in the guided play group having higher post-test scores on phonological awareness than their peers who were exposed to typical curriculum. In addition, the group that the children were randomized to was a significant predictor of the children's post-test scores of pre-literacy, with children in the guided play

group having higher post-test scores on pre-literacy than their peers who were exposed to typical curriculum. Lastly, in terms of the correlation between the teacher evaluations and the direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills, the strongest correlation was between the teacher evaluations and the change in the children's scores on the Phonological Awareness subtest of the CELF-P2 over the duration of the intervention. That being said, even the strongest correlation had a small effect size. The findings of my study contributed to the literature in terms of both existing studies and to big theories in this area.

7.1.1 Contribution to existing studies. My study included 4- and 5-year-olds from low-income households and diverse ethnic backgrounds. These demographics have rarely been examined in the literature, my study highlighted the importance of using appropriate and precise measures when examining children's self-regulation, language, working memory, and pre-literacy skills which will be discussed in detail in the next section. Both the results of the path analyses and the hierarchical regression analyses highlighted the issue of replicability and emphasized the need for further research in this area with a much larger sample size in order to examine both the efficacy of the guided play intervention as well as the relationship between children's self-regulation, language, working memory, and pre-literacy skills. Furthermore, the low correlations between the teacher evaluations and the direct measures highlight that more research needs to be done in this area especially given that it would aid with the early identification of children who may be struggling with a particular skill.

7.1.2 Contribution to big studies in this area. My study also contributed to big theories particularly regarding the concepts drawn from Vygotskian theory, and the contribution of explicit instruction and play on children's cognitive development. The design of the guided play intervention with elements of pretense was based on Vygotskian theory, where the development of children's skills is influenced by the social aspect of play. The use of scaffolding strategies throughout the course of the guided play intervention allowed the children to focus on the aspects of the intervention that were within their capability at first instance. The intervention highlighted that as per Vygotskian theory the 'more knowledgeable others' (Gottfried et al., 2019) does not necessarily have to be adults and can include more knowledgeable peers who can scaffold the activity. This peer tutoring was further facilitated by the playful environment as it provided the children with a space to explore without any punitive consequences (Elias & Berk, 2002; Rowe, 1998). Additionally, the explicit phonological awareness instruction component of the guided play intervention perhaps contributed to the significant difference in the children's phonological awareness scores post-

intervention in comparison to the children who received the typical curriculum. Thereby highlighting the benefits of explicit instruction for the development of young children's language skills.

7.2 Reflections

7.2.1 Issues with measurement of children's executive function and language skills. Another issue that must be addressed is the one regarding the measurement of children's executive function and language skills. This issue was evident with the low correlations between the three self-regulation measures- the Statue Task, the Head, Toes, Knees and Shoulders Task and the Gift Delay Task- and the low correlations between the teacher reports and direct measures of children's self-regulation, phonological awareness, and expressive vocabulary skills in my study. To begin with the issues of measurement of children's executive function skills including self-regulation and working memory, despite the growing interest in the area of children's executive function skills, there has been a lack of measures for assessing particular aspects of executive function especially for children between the ages of two and six (Blair et al., 2005). One of the issues associated with measures of children's executive function skills is the scalability of different tasks for varying ages. Carlson has analyzed children's developmental trends in task performance and this information is critical towards creating a battery of executive function measures that are both reliable and valid and can be used in early childhood. This initial step has provided researchers with an opportunity to estimate children's probability of success on a given task while considering their age.

As for the development of children's self-regulation skills, advances in research on developmental neuroscience have contributed to the improved understanding of children's cognitive abilities particularly in terms of the increased precision of its measurement. One of the areas of recent research has focused on how children use their self-regulation skills to adapt to developmental demands including emotional and inhibitory control, controlling impulsive behaviour, maintaining social relations, and attentional control in school (Blair et al., 2005). There still is a lot of work and future research that needs to be done to enhance the manner by which children's executive function skills can be assessed in early childhood. However, advances in this area over the years have greatly increased our understanding of the numerous ways by which children are able to showcase age-appropriate cognitive and social skills.

In terms of the issues surrounding the measurement of children's language skills, as noted by Law and colleagues (2017), there is not one correct answer as to how to best measure young children's abilities in this area. This variability in responses occurs as young children are expected to achieve a number of milestones in different domains of language development including babbling, gesturing, sentence complexity and vocabulary that vary depending on the stage of development. Global measures such as Wellcomm (Hurd & McQueen, 2010), the CELF-Preschool (Andersson et al., 2019), and the Preschool Language Scale (Blair et al., 2005) provide overall scores that give a general estimate of children's communicative abilities and specific sub-scores within each domain. However, this scoring system is not true of every global measure of children's language skills as some only provide an overall score and give no information about the particular sub-scores within each domain. This lack of information about the sub-scores within each domain can make it difficult to identify the particular area of language that the children might find challenging and it is more difficult to assess children's skills in early childhood than when they are older.

Furthermore, the use of global measures with specific sub-domain scores can be costly and time-consuming to undertake even though the information they provide is critical. Hence, researchers have to strike a balance between the accuracy and interpretability of the measures they use while considering the ease of delivery and implementation of these measures. I had to strike this balance in my study when considering both these aspects as I settled on the measures that I administered in my study (Appendix H). More research is needed to evaluate and develop reliable and valid measures of children's language skills in early childhood. For instance, Law and colleagues suggest using tests that examine the number of words that children know at a certain developmental stage as opposed to language learning in general in order to examine children's expressive vocabulary skills. This suggestion can include the use of standardized tests as well as parent report measures such as the MacArthur-Bates Communicative Development Inventories (Fenson, 2007). Moreover, there have been issues about using parent reports as clinical tools, but they do provide key information about identifying patterns of children's language development.

Furthermore, the issues with measurement of children's executive function and language skills highlight the difficulty of conducting interventional studies in these areas. The next sub-section will further examine the issues associated with carrying out intervention research in education.

7.2.2 Issues with conducting interventional cognitive science research. There is often a need expressed for more evidence-based research in education and more research involving the use of randomized control trials to examine the efficacy of interventions (Wiliam, 2019). However, often less acknowledged is the difficulty of conducting randomized control trials and interventional research in childcare and educational settings. In such settings, aspects that are key to the randomized control trial design, including blinding and fidelity, are difficult and often impossible to implement given the context of the setting themselves. For instance, when I initially designed my intervention which involved the use of a small-scale experiment, I intended for children to be randomized to the guided play group or the art activities group using the class lists. However, in order to obtain an adequate sample size, my research design had to be adapted so that it was conducive with the day-to-day running of the school. Consequently, in School I the children were randomized based on their ability groups as that was how teaching was typically delivered in that school, and the children in Schools II and III were randomized to the experimental group (guided play) or the active control group (art activities) by their class lists.

Given that I used a standardized protocol to administer the intervention across all three schools, I observed that children in the low-ability group struggled more with the intervention than those children in mixed ability groups from Schools II and III. This difficulty largely occurred as all the children had a similar ability and often struggled with the initial sound component of the explicit phonological awareness instruction and as such often found the rhyme component extremely challenging. This in turn frequently resulted in them getting frustrated and it was difficult to keep them motivated during both the explicit phonological awareness and vocabulary instruction in the shared storybook reading component and the review component of the intervention. As per the Teaching and Learning Toolkit developed by the Education Endowment Foundation (2018c), teaching using ability grouping has been shown to slightly reduce children's achievement and although I was aware of this information, I had to continue with this practice in order to include the children in my study.

Law et al. (2017) also highlights that interventional studies frequently do not include long-term follow up and on a rare occasion if it is included, it tends to be measured using repeated measures of the same constructs as opposed to using measures that focus on children's socio-emotional factors. Additionally, interventional studies in the area of children's language development rarely examine sleeper effects which would contribute to the

growing body of evidence in this area. When initially conceiving the design of my study, I intended to measure the children at three time points- pre-intervention, post-intervention and delayed post-test- to examine if the effects of the intervention were sustained. However, due to time constraints and the increased level of involvement of the schools that was required to administer the delayed post-tests, I had to compromise on the design of my study. Consequently, I assessed the children's self-regulation, language, working memory and pre-literacy skills at two time points- pre-intervention and post-intervention- which meant that I unfortunately could not examine the long-term or the sleeper effects of the intervention.

In addition, the measures that I used in my study may not necessarily have captured the full picture of children's self-regulation, language, working memory, and pre-literacy skills that I noticed when I spent time in the classrooms. This gap could be attributed to the children settling into reception, which is their first year in school, as opposed to the efficacy of the intervention itself. Although I used the recommended standardized direct measures, my study led me to question what and how young children's skills are measured and whether they can tap into the improvements achieved in the intervention. I especially recognized this aspect when examining the correlation between the three self-regulation measures- the Statue Task, the Head, Toes, Knees and Shoulders Task, and the Gift Delay Task- as they were low correlations between the measures. Additionally, I came to better understand the importance of using measures that are not only age-appropriate but also consider the specific demographics of the sample. Although all three measures of self-regulation that I used were robust measures of the children's skills in this area, the Head, Toes, Knees and Shoulders Task was the best one for my study as it involved reduced language competence compared to the other two measures and had a practice component that is especially beneficial when working with children with EAL.

Additionally, when conducting my small scale experiment, I learned that despite how well I might have designed my study, the findings supported my conclusions at one point in time, and thus, the validity of the results are not necessarily a property of my experiment but instead of the inferences that I drew from my findings (Wiliam, 2019). For instance, the inferences that I drew from my results were unable to consider the influence of explanatory variables such as the age of the parents and child, child's gender, family composition, languages spoken at home, parents' level of education and employment status, parents' marital status, ethnicity, frequency of home reading, length of stay in the UK, and prior childcare experience as I was unable to collect data in this area due to low responses on the parental questionnaire. Additionally, my study did not consider when the results were

influenced by the amount of language that the children engaged in over the duration of the intervention. Accordingly, my study has low external validity, as commonly noted with most randomized control trials, as it is difficult to extend the findings as gathered in a controlled setting to a wider population that faces a myriad of factors, not just the effect of the independent variable being examined.

Furthermore, it is particularly difficult to conduct interventional research with disadvantaged samples such as that included my study which consisted of children from low-income households and diverse ethnic backgrounds. The Education Endowment Foundation (2018b) emphasizes that in order to promote communication, language, and literacy in the early years, it would be beneficial if interventional studies provided support to parents so that they were able to understand how to encourage their children's learning. The Education Endowment Foundation suggests conducting workshops where parents are shown strategies about how to read and talk about storybooks effectively with their children; less successful strategies include carrying out infrequent home visits or providing homework tasks. That being said, it is particularly challenging to gain parental engagement in a study especially in the case of disadvantaged families. I struggled with low participation from parents and as such was unable to collect data to answer the research questions regarding the frequency of pretend play in parent-child interactions amongst families whose children have EAL, and parents' attitudes toward pretend play and its relation to the development of self-regulation, language, and pre-literacy skills. Due to practical constraints in the research process, I used an opt-out consent form to recruit the adequate sample size. I also delinked the parental questionnaire from the intervention itself so should one aspect not be possible due to lack of responses received; my study would still contribute to the knowledge base about pretend play and the development of children's self-regulation and language skills. This challenge in recruitment underlines the need for further research in this area and the importance of creating means by which the participation in research studies is accessible to all.

Nevertheless, given the importance of the home learning environment on children's cognitive development (Melhuish et al., 2008), although I was not able to gain sufficient responses to my questionnaire, I held a public engagement event to provide parents with an opportunity to see how the intervention takes place and more importantly to understand the rationale behind its design. I conducted the guided play intervention at the Faculty of Education University of Cambridge as part of the annual Festival of Ideas event in autumn 2018 where parents and children could drop in and participate in the intervention including shared storybook reading, roleplaying or engaging in art activities, and reviewing the whole

activity. As I led the activity with the children, the parents were able to watch. I also provided them with a pamphlet that explained the rationale behind the design of the intervention so they could better comprehend the contribution of play towards children's learning and how explicit instruction could be used to enhance children's phonological awareness and vocabulary skills (Appendix I). Ellefson, Baker, and Gibson (2018) emphasize that participating in activities such as the Festival of Ideas helps to foster relationships in the local area. In another attempt to increase parental engagement in my study, I held sessions during the school drop-off and pick up times where parents could complete the questionnaire digitally or use a hard copy. However, this strategy was ineffective as not a single parent came to the sessions.

My study was subjected to a few limitations including the sample size and source bias. Given the sample size of the study, I was unable to examine the efficacy of the intervention at the school or the classroom level. Moreover, I was only able to include the data collected about the children's working memory and pre-literacy skills for the children in Schools II and III, not School I so this analysis is purely explanatory as it was underpowered. Furthermore, I was unable to conduct intervention component analysis and as such cannot conclusively say whether the hypothesized mechanisms in my intervention were successful (Sutcliffe, Thomas, Stokes, Hinds, & Bangpan, 2015). For instance, despite asking the children in the art activities group not to engage in art activities related to the storybook, in most cases children did engage in art activities related to the storybook. However, the children's artwork was more reflective of popular culture such as movies and celebrities as opposed to the storybooks that I read to them. Finally, my study was also prone to source bias as I carried out the intervention and conducted the assessments of the children. However, due to the lack of resources this issue was not feasibly solved but the results of the study were viewed in light of these limitations.

7.3 Implications

A few of the things I learned over the course of my study that are needed to implement a cognitive science informed intervention in the classroom was the ability to be flexible, communicate effectively with teachers, be consistent and attentive to the children's stage of development, and ensure that the intervention is cost-effective and multifaceted. These lessons are aligned with Ellefson et al. (2018) who note that when conducting research in schools, it is important to consider the different structures, time frames, and semantics. For example, in addition to the typical school day, there are plenty of

other activities that children participate in whether it be school plays or field trips. Consequently, it is critical that researchers build in some flexibility in the timeframe of the design of the intervention to ensure that they are able to recruit the adequate sample size and it does not add pressure to the schools that participate in the study.

In addition, communicating effectively with the teachers is critical to the implementation of the intervention. Ask teachers what form of communication they would prefer, email or texting, and request a weekly schedule of school events so that the researcher can plan their intervention appropriately around these events. Furthermore, if you require the teachers to complete measures in the study, provide them with an example so they know what the expectations are and let them know early on the deadline for receiving their responses. The example gives teachers an opportunity to ask questions and clarify any misunderstandings they might have. Often teachers would like to know not just the rationale of the study but also the implications in terms of their teaching practice and its pertinence to their students (Ellefson et al., 2018). Additionally, teachers have so many responsibilities they are juggling with already so whenever possible make things succinct and provide them with copies, both hard and soft copy, of the design of the intervention so they have a reference.

I also learned that it would be handy to come up with a backup space to use in case the area that is typically used for the intervention is occupied. Learning the method of discipline at the school, whether it be timeout or demerit points, is also key so the researcher can remain consistent while implementing the intervention with the children. With regards to working with young children, ensure that the intervention is developmentally appropriate and that it captivates the children as their attention tends to drift quickly. Also, young children tend to fall ill frequently so input additional time in the study's timeline for data collection. The timeline for data collection will also depend on the target and nature of the intended outcomes of the intervention, whether they be group-level or individual-level outcomes (Fraser et al., 2009).

In terms of the specifics of the guided play intervention used in my study, I embedded opportunities for children to develop their self-regulation and language skills in all three components of the intervention. As reiterated by the Education Endowment Foundation (2017), the use of scaffolding is also effective as it ensures that the activities remain appropriately challenging for the children and allows for the development of their skills. When implementing a cognitive science informed intervention such as the guided

play intervention in my study, it is imperative that the practicalities of the intervention are suitable for the sample. Moreover, given the attainment gap for disadvantaged children, my guided play intervention is cost-effective as it can be replicated using existing resources found in the classroom, and more importantly does not disrupt the existing infrastructure of the school. The props required include storybooks and roleplaying items which are easily accessible and are in accordance with the Early Years curriculum as all reception classrooms already have a roleplay corner (*Learning Through Play in the Early Years*, n.d.). The Education Endowment Foundation (2018a) and Law et al. (2017) emphasize the benefit of the minimal costs associated with play-based learning, and highlight that it would be beneficial for researchers and practitioners to consider how the equipment present in the classroom supports the development of children's skills without necessarily relying on support from adults. All in all, it is important that the design of cognitive science informed intervention in the classroom is multifaceted which could include dialogic storybook reading, scaffolding classroom interactions or explicit phonological awareness and vocabulary instruction to name a few (Law et al., 2017).

7.4 Future Directions

With regards to future directions, my study attempted to address the gap in the literature for disadvantaged 4- and 5-year-olds. Children in the guided play group had higher post-test scores in phonological awareness and pre-literacy skills which warrants further research in this area with a larger sample. I aim to further develop the guided play intervention with parents and teachers who have influence on children's educational outcomes. Family has a profound role on the developmental psychology of the child but has rarely been empirically investigated when it comes to parent-child interactions involving pretend play with a guided approach. Law et al. (2017) suggests conducting evaluations of interventions involving parent-child interactions. The accessible design of the guided play intervention and its cost-effectiveness allow the intervention to be implemented within the home environment. It would be interesting to see whether the change in the setting influences the children's outcomes, and how it affects parent-child interactions.

The collaboration with teachers on the guided play intervention is also important as they are able to provide feedback about the practical considerations of developing children's self-regulation and language skills within the classroom. It would also be worthwhile training early year practitioners to deliver the intervention and see how this change influences children's outcomes. The evidence suggests that practitioners would benefit from practical

suggestions about how play-based learning can be incorporated effectively into the classroom to support children's learning (Pyle et al., 2018). It would also be interesting to conduct the intervention on a larger scale and examine if the results from my PhD project are replicable with a larger sample. This work can inform educational policies and professional childhood development services and can be used to identify methods that will have long-term benefits for children.

7.5 Conclusions

What stands out in this work is the importance of conducting interventional research with children from low-income households and diverse ethnic groups; and the work leads to a better understanding of the relationship between children's self-regulation, language, working memory, and pre-literacy skills. More research is needed with a larger sample size to address the gap in the literature, but this study highlights that interventions that are cost-effective, culturally and developmentally appropriate and are aligned with the existing infrastructure merit further work with practitioners and parents alike. Parents would benefit from workshops and public engagement events where they are shown practical strategies about how they can support the development of their children's executive function and language skills.

Additionally, further research on whether bilinguals have an advantage in the development of their executive function skills is required to examine if this relationship is mediated by the children's SES and ethnicity. Longitudinal studies and interventional studies that examine sleeper effects would be beneficial in this area. Moreover, more research is needed to evaluate and develop reliable and valid measures of children's executive function and language skills in early childhood. The measures used could include standardized tests and parent reports. Furthermore, the implementation of cognitive science informed interventions in the classroom would benefit from flexibility, effective communication with teachers, and consistency and attentiveness to the children's developmental stage. There is not one ideal approach when designing an intervention, rather researchers must bear in mind the precision of the intervention, the target audience, and the practical constraints associated with the implementation process. It is also critical that the appropriateness of the measures of the relevant outcomes are taken into consideration.

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Appendices

Appendix A

Research ethics review checklist for Faculty of Education

Section A: Details of the Project

Student Name	Tanya Paes
Supervisor	Dr. Michelle Ellefson
Registration Report Title	The efficacy of a pretend play intervention on the self-regulation, language, and pre-literacy skills of pre-schoolers from families with English as An Additional Language (EAL)

Section B: Checklist

Code of Practice relating to Educational Research		
1a	Have you read the *Revised Ethical Guidelines for Educational Research* (2011) of the British Educational Research Association (BERA)? (if you have not read it, the latest version is available at http://www.bera.ac.uk/researchers-resources/publications/bera-ethical-guidelines-for-educational-research-2011	Yes
1b	Is this Code relevant to the conduct of your research? If you have answered 'no', please briefly explain why:	Yes
1c	Do you agree to subscribe to the Code in carrying out your own research?	Yes
2	Are there any aspects of your proposed research which, in the context of BERA's Code of Practice, might give rise to concern amongst other educational researchers?	No
3a	Will you be analysing an existing data set that has already been collected by someone else?	No
4	Will you be collecting your own research data for the study (through such techniques as interviewing people, observing situations, issuing questionnaires etc)? ***nb. If you have answered NO to this question, you may proceed to Section C and need not answer any further questions in this section.***	Yes
Obtaining 'Informed Consent'		
5	Are you familiar with the concept of 'informed consent'? (if you are not familiar with this concept you should first consult the following source: page 5 of the BERA guidelines above).	Yes

6	Does your research involve securing participation from children, young people or adults where the concept of 'informed consent' might apply? *Permission is likely to be needed to report any information about people or institutions that is not in the public domain, and which you have been able to obtain due to your privileged access to the research site(s) in whatever capacity* [1]	Yes
If you have answered 'yes' to Question 6 above, please answer the following questions.		
7a	Do you believe that you are adopting suitable safeguards with respect to obtaining 'informed consent' from participants in your research in line with the Code of Practice?	Yes
7b	Will all the information about individuals and institutions be treated on an 'in confidence' basis at all stages of your research including writing up and publication?	Yes
7c(i)	Will all the information collected about the institution(s) where research is based be presented in ways that guarantee the institution(s) cannot be identified from information provided in the report? *Note: in a thesis written by a researcher about a research context where they have a publicly acknowledged role, it is difficult to disguise the identity of the institution whilst also providing the expected detail of the researcher's relationship with the research context.*[2]	Yes
7c(iii)	Will all the information collected about individuals be presented in ways that guarantee their anonymity? *Note: a person with a named role, or having a specific set of reported characteristics that is unique in the research context, cannot be assured of the anonymity when the identity of the research site cannot be protected.*	Yes
The Involvement of Adults in the Research		

[1] Professional work (such as teaching) can involve the collection of evidence to better understand problems/issues and to evaluate innovative practice - leaving practitioners with the question of when these activities become formal research requiring informed consent. This comment is meant to highlight how the collection of data for public reporting beyond the institution (e.g. in a thesis) should be considered as a key criterion for deciding when informed consent is required.

[2] At present the implicit assumption is that anonymity is always desirable*, and is always achievable. In many studies these assumptions are sound. However, a practitioner (e.g. teacher) reporting research into their own practice/institution in a thesis would normally need to be explicit about their professional relationship to the research context to give an authentic account of their research. As the staff lists of many educational institutions are in the public domain and often readily found by a web search, a thesis by a named member of staff allows the institution to be readily identified from the name of the thesis author.

Given that an institution can readily be identified, this also has consequences for the degree of anonymity that can be promised to participants - for example those with named roles such as Head of Year 11, Student Voice Coordinator, Head Prefect, etc, or those identifiable from detailed reported characteristics.

* Some institutions or participants may welcome being acknowledged by name in a thesis, and their views should be taken into account and balanced against other considerations.

8a	Will your research involve adults?	Yes
If you have answered 'yes' to Question 8a above, please answer the following questions; otherwise move to Question 9.		
8b	Will these adults be provided with sufficient information *prior* to agreeing to participate in your research to enable them to exercise 'informed consent'?	Yes
8c	Will the adults involved in your research be in a position to give 'informed consent' themselves with respect to their participation?	Yes
8d	Will these adults be able to opt out of your research in its entirety if they wish to do so by, for example, declining to be interviewed or refusing to answer a questionnaire?	Yes
8e	Will these adults be able to opt out of parts of your research by, for example, declining to participate in certain activities or answer particular questions?	Yes
The Involvement of Children, Young People and other potentially Vulnerable Persons in the Research		
9a	Will your research involve children, young people or other potentially vulnerable persons (such as those with learning disabilities or your own students).	Yes
If you have answered 'yes' to Question 9a above, please answer the following questions; otherwise move to Question 10. In educational and social research 'informed consent' regarding access is often given by a 'gatekeeper' on behalf of a wider group of persons (e.g. a head or class teacher with respect to their pupils, a youth worker working with young people, another person in an 'authority' position).		
9b	Who will act as the 'gatekeeper(s)' in your research? Please list their position(s) briefly below and, where this is not self-evident, describe the nature of their relationship with those on whose behalves they are giving 'informed consent'. **The researcher cannot act as the gatekeeper**	
i	The classroom teachers will act as the gatekeepers but they are also participants in the study as they will be completing a survey on the children's performance	
ii	The principals of the schools will also act as a gatekeeper	
iii	The parents although they will be included in the study will also act as gatekeepers because they can opt out of the study at any time	
9c	Will you be briefing your 'gatekeeper(s)' about the nature of the questions or activities you will be undertaking with the children, young people or other potentially vulnerable persons involved in your research?	Yes
9d	If another person (such as a teacher or parent of a child in your study) expressed concerns about any of the questions or activities involved in your research, would your 'gatekeeper(s)' have sufficient information to provide a brief justification for having given 'informed consent'?	Yes
9e	If unforeseen problems were to arise during the course of the research, would your 'gatekeeper(s)' be able to contact you at relatively short notice to seek advice, if they needed to do so?	Yes

9f	Could your 'gatekeeper(s)' withdraw consent during the research if, for whatever reason, they felt this to be necessary?	Yes
9g(i)	Are you undertaking research into your own professional context/institution (e.g. with students in a school where you work)? If you answered 'Yes' then you should identify (in 9b above) a suitable senior person who has agreed to act as an independent point of contact for participants to act as the gatekeeper, and answer the following two questions:	No
9g(ii)	Will you ensure that other people in the research context are aware of the identity of the gatekeeper?	Yes
9g(iii)	Will you take reasonable precautions to ensure that research participants (and where appropriate their parents/guardians) know that they should contact the gatekeeper (and not you) if they have any concerns about the research?	Yes
Other Ethical Aspects of the Research		
10	Will it be necessary for participants to take part in the study without their knowledge and consent at the time? (eg covert observation of people in public places)	No
11	Will the research involve the discussion of topics which some people may deem to be 'sensitive'? (e.g. sexual activity, drug use, certain matters relating to political attitudes or religious beliefs)	No
12	Does the research involve any questions or activities which might be considered inappropriate in an educational setting?	No
13	Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to study participants or will the study involve invasive, intrusive or potentially harmful procedures of any kind? *If you have ticked 'Yes' it is vital to refer the matter to the Faculty Research Office for onward reference to the University Insurance Section.*	No
14	Will blood, tissue or other samples be taken from the bodies of	No
15	Is pain or more than mild discomfort likely to result from the study?	No
16	Could the research involve psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?	No
17	Are there any other aspects of the research which could be interpreted as infringing the norms and expectations of behaviour prevailing in educational settings?	No
18	Are there any other aspects of the research which could be to the participants' detriment?	No
19	Will the study involve prolonged or repetitive testing?	Yes

20	Will financial inducements (other than reasonable expenses or compensation for time) be offered to participants?	No

SECTION C: Interpretation of Results

If any of your answers coincide with the response options having a coloured background, then you should assume that further discussion involving Stage 2 procedures is required because some aspect of your proposed research is likely to be 'ethically sensitive'. In practice, many issues can be resolved at this stage. In practice, many issues can be resolved at this stage.

Members of staff should be especially careful about research involving their own students (question 9g).

If you have ticked 'yes' in response to one or more of questions 10 to 20, both Stage 2 ***and*** *Stage 3 clearance will definitely be required.*

Stage 2 Clearance

Any 'ethically sensitive' responses identified above should be discussed with a 'knowledgeable person of standing'. In the case of students within the Faculty, this person will, in almost every case, be the person supervising your research.

On completion of the discussion, the 'knowledgeable person of standing' is asked to choose one of the following three responses, to delete the other two and to affirm their views by adding their signature.	
a	I have discussed the ethical dimensions of this research and, as outlined to me, I do not foresee any ethical issues arising which require further clearance.
~~b~~	~~There may be some ethical issues arising from this research. I think it would be prudent for the researcher to seek further advice and, possibly, Stage 3 clearance.~~
~~c~~	~~Ethical issues arise in this research which require further discussion; my advice is that Stage 3 ethical clearance should be sought.~~

Supervisor Name	Dr Michelle Ellefson
Date	11 May 2016

Appendix B

Books that were initially considered but were later eliminated for use in the study

Name of Book	Author	Reason that the book was eliminated
The Blue Balloon	Mick Inkpen	Does not have a fantastical theme
Harris finds his feet	Catherine Rayner	Does not have too much of a fantastical theme
I want my hat back	Jon Klaassen	Funny but repetitive so picking out 18 words would be quite difficult. The book is hilarious, but the punch line might not be difficult to grasp for children with EAL
Stuck	Oliver Jeffers	Does not have a fantastical theme
Up and Down	Oliver Jeffers	Touches on themes of separation, but given the possible disadvantaged circumstances of the participants it might be a good idea to refrain from using the book
This book just ate my dog	Richard Byrne	Does not have a fantastical theme
Last stop on Market Street	Matt De La Pena	Might be too long to read in the span of 10 minutes
That is not a good idea	Mo Willems	Cinematically styled, and it might be difficult to find 18 words for explicit phonological awareness and vocabulary instruction
Blown Away	Rob Biddulph	Full of rhymes and might be difficult for the children with EAL to follow the story
Zog	Julia Donaldson	Contains many references to school terminology as used in the UK

Appendix C

Parental Questionnaire including Demographic Information

PLAY & LANGUAGE STUDY
Parental Questionnaire

This section asks general questions about you and your family.

Your Age:
_____

Your relation to your child:
- ❍ Adoptive father
- ❍ Adoptive mother
- ❍ Biological father
- ❍ Biological mother
- ❍ Foster father
- ❍ Foster mother
- ❍ Step-father
- ❍ Step-mother
- ❍ Other: Please specify your relation to your child:

  _____

Your child's date of birth:

Year	Month	Day

Is your child a boy or a girl?
- ❍ Boy
- ❍ Girl

Age and gender of your child's siblings (If applicable):

	Gender (select one)		Age
	Male	Female	(Years)
Sibling 1	❍	❍	
Sibling 2	❍	❍	
Sibling 3	❍	❍	
Sibling 4	❍	❍	
Sibling 5	❍	❍	
Sibling 6	❍	❍	

How many years have you been in the UK? _____
Approximate date of arrival (month/year)? _____

Did you child come to the UK at the same time?
- ❍ Yes
- ❍ No

If not, when did your child come to the UK? _____

If your family moved to the UK before your child was born, was your child born in the UK?
- ❍ Yes
- ❍ No

What is the main language you speak at home?
- ❍ English
- ❍ Other languages – please specify the main language you speak at home:

_____
____

How much English do you speak? Please choose one of the following options:

Not Fluent in English	Limited Fluency in English	Somewhat Fluent in English	Quite Fluent in English	Very Fluent in English
No understanding or speaking ability	Some understanding and can say short, simple sentences	Good understanding and can express myself on many topics	Can understand and use English adequately for work and most other situations	Understand almost everything. Very comfortable expressing myself in English and all situations

What language(s) do you speak with your child? Please choose one of the following options:

Mother Tongue: The language that you would typically speak at home other than English

English Never Mother Tongue always	English not often Mother Tongue always	English 50% Mother Tongue 50%	English usually Mother Tongue not often	English almost always Mother Tongue almost never

At what age did your child start receiving consistent and significant exposure to English?

Consistent and significant: English-language daycare or babysitter fulltime or at least three days per week or equivalent part-time. English-language school of any kind counts as consistent and significant.

Child's Age: _____ Date of entry into program (month/year): _____

How many years of education do you have (including home country and the UK)?

Education	Completed	
Primary	Yes	No
Secondary	Yes	No
College	Yes	No
Some College	Yes	No
University – Degree	Yes	No
Some University – Degree	Yes	No
University – Masters	Yes	No

Some University – Masters	Yes	No
University – LL.B, MD, PhD, etc.	Yes	No
Some University – LL.B, MD, PhD, etc.	Yes	No

Please note any other educational experiences below:

What is your employment status?
- ❍ Full time
- ❍ Part time
- ❍ Homemaker
- ❍ Not currently employed

What is your job title?

_____

How many members of staff are you responsible for?
- ❍ None just myself
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ more than 20

How many hours a week do you work?
- ❍ less than 16
- ❍ 16-20
- ❍ 21-25
- ❍ 26-30
- ❍ 31-35
- ❍ 36-40
- ❍ 41-45
- ❍ 46-50
- ❍ more than 50

What is your ethnic group?

- ❍ Asian British
- ❍ Bangladeshi
- ❍ British Chinese
- ❍ Chinese
- ❍ Pakistani
- ❍ Sri Lankan Tamil
- ❍ Other Asian background – (please specify)
  Please specify your Asian Background: _____
- ❍ Black British
- ❍ African
- ❍ Caribbean
- ❍ Other Black background - please specify
  Please specify your Black Background: _____
- ❍ White and Asian
- ❍ White and Black-African
- ❍ White and Black-Caribbean
- ❍ Other Mixed background – (please specify)
  Please specify your Mixed background: _____
- ❍ British
- ❍ Irish
- ❍ Lithuanian
- ❍ Polish
- ❍ Romanian
- ❍ Other European background – (please specify)
  Please specify your European background: _____
- ❍ Other White background – (please specify)
  Please specify your White background: _____
- ❍ Arab
- ❍ Irish Traveller
- ❍ Roma Gypsy
- ❍ Other – (please specify)
  Please specify your background (if other than the above): _____

What is your marital status?

- ❍ Married
- ❍ Have a partner
- ❍ Single (please go to the last question)
- ❍ Widowed (please go to the last question)
- ❍ Divorced (please go to the last question)
- ❍ Separated (please go to the last question)

How many years has your partner been in the UK? _____
Approximate date of arrival (month/year)? _____

How much English does your partner speak? Please choose one of the following options:

Not Fluent in English	Limited Fluency in English	Somewhat Fluent in English	Quite Fluent in English	Very Fluent in English

No understanding or speaking ability	Some understanding and can say short, simple sentences	Good understanding and can express myself on many topics	Can understand and use English adequately for work and most other situations	Understand almost everything. Very comfortable expressing myself in English and all situations

What language(s) does your partner speak with your child? Please choose one of the following options:

Mother Tongue: The language that you would typically speak at home other than English

English Never Mother Tongue always	English not often Mother Tongue always	English 50% Mother Tongue 50%	English usually Mother Tongue not often	English almost always Mother Tongue almost never

How many years of education does your partner have (including home country and the UK)?

Education	Completed	
Primary	Yes	No
Secondary	Yes	No
College	Yes	No
Some College	Yes	No
University – Degree	Yes	No
Some University – Degree	Yes	No
University – Masters	Yes	No
Some University – Masters	Yes	No
University - LL.B, MD, PhD, etc.	Yes	No
Some University – LL.B, MD, PhD, etc.	Yes	No

Please note any other educational experiences of your partner below:

What is your partner's employment status?

- ❍ Full time
- ❍ Part time
- ❍ Home maker
- ❍ Not currently employed

What is your partner's job title?

_____

How many members of staff is your partner responsible for?

- ❍ None just himself/herself
- ❍ 1-5
- ❍ 6-10
- ❍ 11-15
- ❍ 16-20
- ❍ more than 20

How many hours a week does your partner work?

- ❍ less than 16
- ❍ 16-20
- ❍ 21-25
- ❍ 26-30
- ❍ 31-35
- ❍ 36-40
- ❍ 41-45
- ❍ 46-50
- ❍ more than 50

What is your partner's ethnic group?

- ❍ Asian British
- ❍ Bangladeshi
- ❍ British Chinese
- ❍ Chinese
- ❍ Pakistani
- ❍ Sri Lankan Tamil
- ❍ Other Asian background – (please specify)

  Please specify your partner's Asian Background:

  _____
- ❍ Black British
- ❍ African
- ❍ Caribbean
- ❍ Other Black background - please specify

  Please specify your partner's Black Background:

  _____
- ❍ White and Asian
- ❍ White and Black-African
- ❍ White and Black-Caribbean
- ❍ Other Mixed background – (please specify)

  Please specify your partner's Mixed background:

  _____
- ❍ British
- ❍ Irish
- ❍ Lithuanian
- ❍ Polish
- ❍ Romanian
- ❍ Other European background – (please specify)

  Please specify your partner's European background:

  _____
- ❍ Other White background – (please specify)

  Please specify your partner's White background:

  _____
- ❍ Arab
- ❍ Irish Traveller
- ❍ Roma Gypsy
- ❍ Other – Please specify your partner's background (if other than the above):

  _____

About your home:

How many adults live in your house? _____

How many children live in your house? _____

Do each of your children have their own bedroom?

- ❍ No
- ❍ Yes

Does your family own a boat, car, truck, trailer or van?
- ❍ No
- ❍ Yes, number of vehicles owned: _____

Does your family own a computer (desktop or laptop only), tablet or smartphone?
- ❍ No
- ❍ Yes, number and type of electronic devices owned:

_____
___
_____
___

Does your family own a computer (desktop or laptop only), tablet or smartphone?
- ❍ No
- ❍ Yes, number and type of electronic devices owned:

_____
___
_____
___

Does your family own gaming equipment (such as PlayStation, Nintendo Xbox)?
- ❍ No
- ❍ Yes, number and type of gaming equipment owned:

_____
___
_____
___

Does your family own other technological accessories and portable devices purchased in the last 2 years?
- ❍ No
- ❍ Yes, number and type of other technological accessories and portable devices owned:

_____
_____
_____

During the past 12 months, how often did you travel away on holiday with your family?
- ❍ Not at all
- ❍ Once – Please specify the destination:

_____
- ❍ Twice – Please specify the destinations:

_____
- ❍ More than twice – Please specify the destinations:

_____
___

Appendix D

Teacher evaluation adapted from that used in the 'HK-UK Family Thinking Skills Study'

Participant: (Child's first and last names) …… *Please consider any changes you've noticed about this child during the term. Circle the appropriate number and feel free to add any additional comments at the end.*	**much decline**	**some decline**	**no change**	**some improvement**	**much improvement**
Expressive vocabulary skills in English (words used to express oneself)	1	2	3	4	5
Narrative skills in English (storytelling skills)	1	2	3	4	5
Phonological skills in English (able to manipulate sounds and words)	1	2	3	4	5
Pre-literacy skills (i.e. stories have beginnings and endings)	1	2	3	4	5
Autonomy (works independently)	1	2	3	4	5
Attention (able to focus on tasks)	1	2	3	4	5
Hyperactivity	1	2	3	4	5
Good behaviour	1	2	3	4	5
Frustration control (patient in a variety of circumstances)	1	2	3	4	5
Organisation (able to plan effectively)	1	2	3	4	5
Motivation / interest in learning	1	2	3	4	5

Any other comments:

Appendix E

Parental Information Sheet

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Tanya Paes
PhD Student in Psychology and Education
INSTRUCT web: http://sites.google.com/site/instructlab/

Dear Parent/Guardian,

The Principal at [school name], Ms/Mr [name], has kindly given me permission to contact you about a research project currently being carried out by myself as a PhD student at the University of Cambridge.

Why are we doing this study?
The project seeks to explore the effect of a pretend play intervention on the self-regulation, language, and pre-literacy skills of children. Pretend play can be defined as an activity that usually consists of a pretender intentionally projecting a mental representation onto reality. The project is specifically focussed on pretend play as previous research has shown that it allows children to make connections between various areas of learning and experience. Although other projects have demonstrated the link between self-regulation, language, and pre-literacy there has not been a study involving an intervention that has examined all these skills at once.

What is involved?
The project consists of two parts: some activities for your child and a short set of questions for you. Should you agree to participate in this study, it should take you about ten minutes to complete the attached set of questions. These questions ask for a few details about your child's access to different activities, and how they relate to the development of self-regulation, language, and pre-literacy skills. I have attached an envelope for the questionnaire to ensure your confidentiality. Kindly return it to the school staff together with your consent form by [date].

With your consent I along with a couple of other members of the research group (undergraduate students from McMaster University) may engage in story reading followed by either role-playing or art activities with your child. These activities will be carried out in 16 sessions that last 30-minutes each over a 10-week period. The children will take part in these activities in groups of 6-10. These activities are designed to be enjoyable for the child, and he or she will receive stickers and small gifts for his/her participation. These sessions will take place during the school day.

How long will it take?
Your child will be asked to answer a number of questions that assess his or her self-regulation, language, and pre-literacy skills in two 20-minutes sessions. These sessions will occur before the start of the 10-week period and once again following the end of the time period. In December 2017 or January 2018, your child will also be assessed on his or her language skills.

How will the data be used?
The data collected for this study are for research purposes only. It is likely that the results will be reported at professional conferences and/or in academic books or articles. These reports will be written based on group data. If, on the rare instance that individual data might be used, no identifying information will allow others to trace those responses back to the person who gave them. Finally, short reports, based on group data only, will be sent to your child's school.

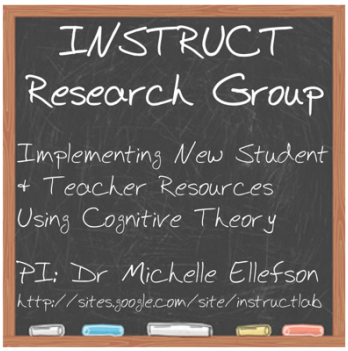
Is the study voluntary?
This study is completely voluntary, that means that is your decision whether or not you and your child participate in the research. Further, your child will only be included in the study if it is clear that he or she is happy to take part. You are also free to withdraw your child from the study at any time without explanation.

Will the data be kept confidential?
All information gathered will be kept strictly confidential and only used for research purposes. We store the data using random ID numbers so that the data cannot be linked back to you or your child. The data will be stored on secured electronic files, and it will be accessible only by the Principal Investigator (Dr Michelle Ellefson), and the lead researcher for this study (Tanya Paes).

Are there any risks?
There are no known risks associated with participating in this study. This study has also received ethical approval from the University of Cambridge Faculty of Education and we have undergone the necessary background checks for working with children.

How can you and your child participate in the study?
This study depends on the willingness of parents and children; I would be very grateful if you were able to give your consent, and agree for you and your child to be included in this study. Please note that I will only be able to include both you and your child if we have received both the consent form and the questionnaire from you. After receiving both, then we will offer you and your child a chance to participate in the study.

What happens if you have any questions?
Please feel free to contact the lead researcher on this project (Tanya Paes) or your child's classroom teacher if you have any questions or concerns you would like to discuss. We will send a newsletter to all the schools taking part in the research when it is complete (spring 2019). If you would like to receive this newsletter directly, please let us know by contacting us by email.



Thank you for your time,

Tanya Paes
PhD student in Psychology & Education

Appendix F

Parental Opt-In Consent Form

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Tanya Paes
PhD Student in Psychology and Education
INSTRUCT web: http://sites.google.com/site/instructlab/

PLAY & LANGUAGE STUDY
Parental Consent Form

If you agree for yourself and your child to participate in this study, then please complete this consent form and the set of questions attached on the next pages.

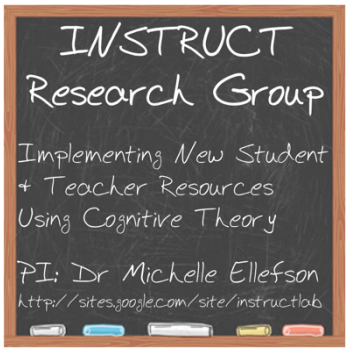
Name of Child:
……..

	Please circle one:	
I give permission for my child to participate in this study	*Yes*	*No*
I have read the information letter and understand the aim of the project	*Yes*	*No*
I have the name and email of the researchers (see study information letter)	*Yes*	*No*
I understand that the data collected for this research project will be kept confidential; all data will be identified by a random code that is not linked back to myself or to my child and will be kept in a secured location	*Yes*	*No*
I understand that I can withdraw myself and my child from this study at any time without giving a reason; Further my child may withdraw from the study at any time without giving a reason	*Yes*	*No*
I understand that the results of this study will be summarized in a report (only grouped data will be reported, not individual data). If I wish, I may ask the researchers for my own copy of this report	*Yes*	*No*
I understand that these data may be presented at professional conferences or in academic manuscripts. These results will be written up based on group data; no individual results will be reported	*Yes*	*No*
I understand that this study has received ethical approval from the University of Cambridge Faculty of Education	*Yes*	*No*

Signature …… Name (please print)
…….

Date ……. Relationship (circle one): Parent / Guardian

Best way to contact me:
Phone …… or
Email…….
Postal Address:
……...
Postcode: ……



Appendix G

Parental Opt-Out Consent Form

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Tanya Paes
PhD Student in Psychology and Education
INSTRUCT web: http://sites.google.com/site/instructlab/

PLAY & LANGUAGE STUDY

Parental Consent Form

To be completed by a parent or guardian who DOES NOT AGREE to them and their child taking part in the Play and Language study at their child's school.

Name of Child:
……..

Name of Child's school:
……

	Please initial the boxes if you agree:
I have read the information letter and understand the aim of the project	☐
I have had the opportunity to ask questions about the project	☐
I <u>DO NOT</u> wish my child to take part in this study	☐

Signature …… Name (please print)
……

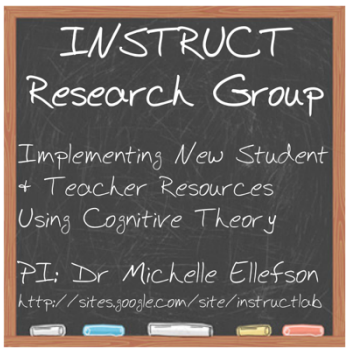
Date ……. Relationship (circle one): Parent/Guardian

Best way to contact me:

Phone …… or
Email…….

Postal Address:
……

Postcode: ……



Appendix H

Measures that were considered but later excluded from the study

Measure	Reason for Exclusion
Early Childhood Environment Rating Scale-Revised (ECERS-R)	The Early Childhood Classroom Observation Measure (ECCOM) appears more suitable. Also based on the suggestion from a researcher in the field, the ECCOM is focused on the quality of the interpersonal relationship, and gives theoretically driven dimensions
Early Childhood Environment Rating Scale (ECERS)	Does not measure instructional practice
The Assessment of Practices in Early Elementary Classrooms (APEEC)	Classroom observational checklist with dichotomized options that is designed for early grades in elementary school, hence was not suitable for the study's sample
Assessment Profile for Early Childhood Programs: Research Version	The dichotomous response may not be appropriate to capture the extent of the children's skills, and does not consider the type of instructional approach
The Early Language and Literacy Classroom Observation (ELLCO)	I was unable to get access to the task in England for use in the study
The Shape School Task	Although the task is suitable for children between the ages of 3-6, it serves as a measure of executive function (EF) in its entirety. My study focuses more so on the self-regulation component of EF, specifically behaviour regulation
Pre-school self-regulation assessment	Would take too long to administer, and examines all 3 aspects of self-regulation but I am solely interested in behaviour regulation for the purposes of this study
Segmenting and Blending	The literature suggests focusing on larger components such as words to ensure the appropriate level of difficulty for the children included in the study
Phonological Awareness Test	Appropriate for children from 5 years and 9 months, hence, was not suitable for the study's sample
The Gillon Phonological Awareness Training Programme	only appropriate for children between the ages of 5 and 7, hence was not suitable for the study's sample
Pictoral Scales of Perceived Confidence of Social Acceptance for Young Children	The Picture Peabody Vocabulary Test- Third Edition (PPVT-III) appears to be more robust in comparison
Woodcock-Johnson Psychoeducational Battery III tests	The PPVT III appears to be more robust in comparison
Picture Peabody Vocabulary Test-Third Edition (PPVT-III)	The use of one standardized measure such as the CELF-P2 to test expressive vocabulary, pre-literacy and phonological awareness is preferred
Checklist from the 'Think-Art! Study'	Assessment of children's engagement during the time period of the intervention using the checklist was ineffective as I was unable to gather details about all 25 factors for each child

Appendix I

Festival of Ideas 2018 Pamphlet

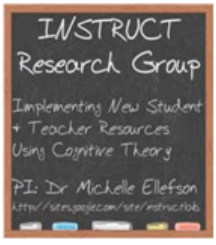
UNIVERSITY OF CAMBRIDGE
Faculty of Education

Pretend Play and Children's Language Development

***Festival of Ideas, Playful Learning Zone*, October 26, 2018**

During the session the children will have a chance to have a storybook read to them, and then they can choose to take part in roleplay or art activities. The session will end with the children going over the story, and sharing the details of the roleplay or art activities they engaged in.

Engaging in pretend play or act activities following shared storybook reading can provide children with opportunities to develop their language and pre-literacy skills.



What is Pretend Play?

- Pretend play is also known as dramatic, fantasy, imaginative or make-believe play.
- It is based on using one's imagination.
- Pretend play can overlap with other types of play (such as outdoor play or physical play).
- It allows for the development of children's language and pre-literacy skills.

What is Shared Storybook Reading?

- Shared storybook reading or simply put, reading with an adult provides children with the chance to think about aspects of the texts (such as the use of language).
- It can also allow for the development of early-literacy skills.

Engaging in role-playing activities following shared story reading can provide children with a chance to practice their understanding of the concepts by applying their learning to different contexts.

Reference

Paes, T. M., & Ellefson, M. R. (2018). Pretend play and the development of children's language skills. *Impact, Journal of the Chartered College of Teaching*

Contact Details

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